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By A. Leyland Robinson, M.D. Lond., F.R.C.S. Eng., F.C.O.G.

HON. SURGEON TO THE HOSPITAL FOR WOMEN, LIVERPOOL; PROFESSOR OF OBSTETRICS AND GYNÆCOLOGY IN THE UNIVERSITY OF LIVERPOOL; AND

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In the differential diagnosis of pregnancy the clinician is called upon to decide an issue that may affect the health, the honour, and even the life of his patient. The interests involved in this problem are widespread; they are not limited to the individuals primarily concerned, but may react upon the welfare of other people and thus claim the attention of the community and the State.

The circumstances which call for a positive and sometimes an immediate recognition of pregnancy are indicated in Table I.

Table I.—*Indications for the Diagnosis of Pregnancy*

PERSONAL
To determine the advisability of marriage.
To confirm or contradict the belief of a healthy married woman that she is pregnant.
LEGAL AND SOCIAL
To respite a condemned woman.
To refute a libel.
To detect an impostor who feigns pregnancy in order to: (1) increase the damages in breach of promise, (2) claim money from a seducer, (3) pass off a spurious heir as her own child, or (4) levy blackmail.
To frustrate the attempt of a pregnant woman to conceal her condition in order to: (1) avoid disgrace, (2) procure abortion, or (3) commit infanticide.
To protect the professional reputation of a medical man.
MEDICAL
To establish the diagnosis in women who are unaware of their condition.
To disclose or exclude the possibility of pregnancy as a complicating factor in the course of an acute or chronic organic disease.
To enable a conclusion to be reached in the differential diagnosis of many pathological states.

Table II.—*Differential Diagnosis of Pregnancy*

1. Pregnancy.	Non-pregnant states:— Tumours. Menopause. Myxœdema. Nervous conditions. Pseudo-pregnancy.
2. Intra-uterine pregnancy.	Extra-uterine pregnancy and its simulations—e.g., perforated appendix.
3. Normal (intra-uterine) pregnancy.	Abnormal pregnancy:— Mole. Abortion. Intra-uterine death.
4. Pregnancy complicated by organic disease—e.g., heart disease and pregnancy. Is the disease or the pregnancy the predominant condition?	Pregnancy simulated by organic disease—e.g., tuberculosis or pregnancy.

The problems connected with the differential diagnosis are not restricted to the domain of the specialist, but may arise in any part of the clinical field of medicine or surgery. Their scope is shown in Table II., in which the clinical conditions that simulate pregnancy are grouped under four main headings.

Methods of Diagnosis

We do not propose to consider the ordinary clinical signs and symptoms of pregnancy, except in so far as it is necessary to show that these sources of information are liable to be tainted. The patient's history is usually sufficient to create a strong presumption in favour of or against pregnancy, but it is open to so much falsehood and deception as to be quite unreliable as a means of diagnosis. The symptoms are a great help in straightforward cases, but any of them may be feigned by impostors, concealed by the unfortunate, or imagined by those in whom the wish is mother to the thought.

A few signs are admittedly pathognomonic, but such unequivocal evidence is not always available. Any of the physical signs may be obscured by the effects of disease or deformity, and all of them, with the possible exception of the fœtal heart sounds, may be simulated by non-pregnant pathological states. These sources of difficulty and error associated with purely clinical methods of diagnosis are shown in Tables III. and IV., in which the signs and symptoms of pregnancy are submitted to a short critical analysis.

These Tables show that the uncorroborated history of the patient cannot be accepted as positive evidence of the pregnant state and that any of the physical signs may be absent or so obscured by the effects of disease as to be unrecognisable. For the purpose of diagnosis the clinician cannot depend upon the presence or absence of individual signs or symptoms, but must base his opinion upon a careful consideration of the clinical features as a whole. He must approach the solution of this problem in much the same way as he would tackle a jigsaw puzzle, and in normal cases where the whole of the clinical evidence is available he will find little difficulty in building up the complete picture of pregnancy.

Under less favourable circumstances, where parts of the picture are missing, the diagnosis may be established by the fortunate discovery of a single pathognomonic sign such as the fœtal heart sounds, in exactly the same way as a jigsaw puzzle can be recognised with certainty by the discovery of a small but characteristic piece. In other cases where the clinical picture is incomplete the diagnosis may rest upon the presence of a syndrome that is pathognomonic of pregnancy, although it may be composed of constituent elements that are not in themselves pathognomonic. Thus a history of six months' amenorrhœa, the presence of a lump reaching to the umbilicus, and the discovery of a blowing sound at the side of the tumour cannot be regarded individually as pathognomonic, but when these clinical pieces are applied together they fit each other perfectly and produce a pattern (or syndrome) that is characteristic of pregnancy (and nothing else) in spite of the absence of fœtal heart sounds, breast changes, and uterine contractions.

Under conditions of greater difficulty the picture is not only incomplete, but most, if not all, of the characteristic pieces are missing or mutilated. The remaining elements may be so few and their appearance so atypical that it may be impossible to construct a recognisable syndrome out of the available material, and under these circumstances it becomes impossible

TABLE III.—SHOWING THE VARIABILITY OF THE CLINICAL SIGNS OF PREGNANCY

Physical signs—	Appearances in normal pregnancy.	Changes found in abnormal pregnancy.	Confusion produced by the presence of an independent lesion.	Simulation of physical signs by non-pregnant states.
Tumour.				
Shape.	Pyriform: ovoid.	Circular in hydramnios.	Irregular: tumours; malformations.	Fat: fibroid.
Size.	Corresponds to duration of pregnancy.	Too small: intra-uterine death. Too big: hydramnios.	Too big: tumour.	Ascites: degenerating tumours.
Consistency.	Soft.	Firm: intra-uterine death.	Hard: tumour.	Pseudocyesis: phantom tumour.
Contractions.	Present.	Absent: mole; hydramnios.	Hidden: tumour; obesity.	—
Souffle.	Present.	Unobtainable.	Obscured: tumour.	Fibroid.
Ballottement.	Present 15–30 weeks.	Absent: early pregnancy; hydramnios.	Doubtful: tumour; obesity.	Ascites and tumour.
Breast changes.	Typical: primigravidæ.	Atypical: multiparæ.	Pre-existing: lactation.	Menopause: pseudocyesis.
Fœtal parts.	Palpable and recognisable.	Palpable but unrecognisable; hydramnios.	Impalpable: tumours.	Tumours of special shape.
Fœtal movements.	Present after 18th week.	Absent: dead fœtus.	Doubtful: tumours; obesity.	Pseudocyesis.
Fœtal heart sounds.	Audible after ? 20th week.	Absent: dead fœtus; mole.	Inaudible: hydramnios.	Maternal pulse.
Vaginal changes.	Softening and discoloration.	Indefinite: multiparæ.	Pre-existing: prolapse.	Pre-menstrual with fibroid.
Signs of virginity.	Absent.	Occasionally present.	Destroyed by previous operation.	Malignant disease following infection.

to make a definitive diagnosis. The greatest difficulties of all arise from the association of pregnancy with organic disease, and the resulting confusion can only be compared to the effect produced by mixing two dismembered jigsaw puzzles, abstracting half the pieces from the mixed heap, and then asking someone to sort out the two pictures.

Organic diseases and non-pregnant states such as tumours not only simulate the picture of pregnancy, but they modify and are themselves modified by the effects of conception, and liaisons of this type produce a double clinical picture that is exceedingly difficult to analyse and interpret. The evidences of pregnancy may be overshadowed by the pathological changes induced by disease, and the symptoms of disease may be overlooked in the presence of conception. Thus the amenorrhœa of pregnancy may escape notice in a tuberculous woman and the vomiting of intestinal obstruction may be mistaken for a specific toxæmia in a woman who is known to be pregnant. In such cases it is impossible to say whether the pregnancy exists or not, or if it can be proved to exist, whether the symptoms of which the patient complains are due to the disease itself or to the results of conception. Fortunately these difficulties are exceptional.

We do not suggest that the trained obstetrician commonly has much trouble in recognising the identity of simple pregnancy, but we do affirm that it is impossible for anyone to make a positive diagnosis by unaided clinical methods in the early weeks of gestation, and that even in the later months the most experienced gynæcologist may be mistaken when pregnancy is complicated by the presence of an independent organic lesion. In early pregnancy and in all cases of obscurity, clinical methods must be reinforced by other tests: among the latter radiography has long been regarded as facile princeps. Carried out by an expert this method displays a precision of rare quality and is decisive from the fifth month onwards; it also affords much additional information concerning the development of the fœtus and its relationship to the mother. But even under the most favourable circumstances, a definitive diagnosis cannot be made before the fourth month of gestation, and hence the radiologist is unable to help in the solution of the problem during those early weeks when help is most frequently wanted.

The clinician may have no hesitation in saying that pregnancy is probable or improbable very soon after the possible date of conception, but there is an obvious and perhaps a vital difference between a probable and a positive diagnosis. This difference has long been recognised and many attempts have been made to discover a chemical, physical, or biological test by means of which the presence or absence of

TABLE IV.—VARIABILITY OF THE SYMPTOMS OF PREGNANCY

Symptoms and date of appearance in normal pregnancy.	Variations seen in abnormal pregnancy.	Confusion produced by the presence of an independent lesion.	Simulation of symptoms by non-pregnant states.
Amenorrhœa: onset.	Absent: abortion.	Pre-existent: lactation.	Tuberculosis; myxœdema; menopause; neuroses, &c.
Vomiting: 6 weeks.	Absent: many patients. Excessive: hyperemesis.	Pre-existent: gastric ulcer. Excessive: intestinal obstruction.	Pseudocyesis.
Fœtal movements: 18 weeks.	Absent: mole; dead fœtus.	Feigned: lunacy. Concealed: crime.	Bowel movements.
Enlargement of abdomen: 4–5 months.	Excessive: hydramnios. Deficient: death of fœtus.	Excessive: tumours; obesity.	Phantom tumour; ascites.

French proverb: "Ventre plat enfant il y a."

1. In so far as an intelligent woman in good faith may be quite unaware of her condition, there may be no symptoms.
2. Each and every symptom may be simulated or obscured by the effects of functional and organic disease.
3. Any symptom may be imagined, feigned, or concealed.
4. Any sign or symptom may be missed or misunderstood.

pregnancy may be determined with absolute certainty. A few of the many tests that have been devised for this purpose are described below. They fall naturally into two groups: the first consists of methods that were in use from ancient times to the end of the nineteenth century, and the second is composed of methods that have been devised since 1900; we do not pretend that either of these lists is even approximately complete (Table V.).

Berol's papyrus.—"Place Barley and 'Spelt' (?) in two bottles and moisten daily with the woman's urine. If both grow, she is pregnant; if the barley grows, it is a boy; if the 'Spelt' grows, it is a girl. If neither grow, the patient is not pregnant."

Hippocrates (forty-second Aphorism of his fifth Book).—"If you desire to know whether a woman has conceived or no, give her, going to rest, a draught of Metheglin, and if afterwards she feels pains in her belly, caused by wind, she hath conceived."

Albertus Magnus stated that milk will float on a pregnant woman's urine.

Jacobus Rueff.—Place needles overnight in the chamber into which the urine is passed. If next morning the needles are rusty, pregnancy is non-existent; on the other hand, if the needles are spotted, the woman is pregnant.

Savonarola.—"From the commencement of gestation to the sixth month, the urine is clear and a pale lemon colour, having a cloudiness on its surface with a deposit in the centre resembling carded wool." He warns his readers that similar appearances may be found in a woman from simple suppression of the menses or from a mole, and also in gouty and rheumatic inflammation.

Cornelius Solingen.—"Pour some wine into the urine. If it becomes turbid as though beans had been stewed in it, the woman is pregnant."

Heylsamen Drecks Apothek.—Make two holes in the ground; place barley in one and wheat in the other. Pour the urine from the pregnant woman into both and cover with sand. If the barley sprouts first, it will be a girl, but if the wheat comes up first, it is sure to be a boy.

Stein.—This test emphasised the importance of the shape of the external os which changes from a transverse slit into a circular opening in response to conception. The lips are drawn together by a kind of physiological glue which closes the mouth of the womb and so prevents the escape of the seed.

Nauche.—"By allowing the urine of pregnant women or nurses to stand for sometime, say from thirty to forty hours, a deposit takes place of white, flaky, pulverulent grumous matter, being the caseum or peculiar principle of the milk in the breast during gestation."

Ingleby considered uterine contractions to be pathognomonic of pregnancy.

Pollender.—There is a characteristic musty smell of the vaginal mucus during early pregnancy.

TABLE V.—*Tests for Pregnancy*

Date.	*Author.*	*Nature of test.*
B.C.		
1350	Berol's Papyrus [1]	Urinary.
460	Hippocrates [2]	Alimentary.
	Albertus Magnus [3]	Urinary.
A.D.		
1554	Jacobus Rueff [4]	Urinary.
1560	Savonarola [5]	,,
1693	Cornelius Solingen [6]	,,
1697	Heylsamen Drecks Apothek [7]	,,
1770	Stein [8]	Uterine.
1831	Nauche [9]	Urinary.
1836	Ingleby [10]	Uterine.
1845	Pollender [11]	Vaginal.
1867	Tanner [12]	,,

MODERN LABORATORY TESTS

B.T. = blood tests; P.R. = placental reactions; U.T. = urinary tests.

B.T.	Fahraeus [13]	Sedimentation of corpuscles.
	Erede [14]	Anaphylactic reaction.
	Dienst [15]	Sodium hydroxide and copper sulphate.
	Bercovitz [16]	Adrenaline content of blood.
	Costa [17]	Novocain formalin reaction.
	Binz [18]	Biological.
P.R.	Liepmann [19]	Specific antibodies.
	Abderhalden [20]	,, ferments.
	Engelhorn and Wintz [21]	Cutaneous reaction.
U.T.	Frank and Nothmann [22]	Alimentary glycosuria.
	Kamnitzer and Joseph [23]	Phloridzin.
	Novak and Roubitschek [24]	Adrenaline.
	Aschheim and Zondek [25]	Hormone reactions.
	Friedman [26]	,, ,,
	Brouha [27]	Male mice.

TABLE VI.—REACTIONS IN THE ASCHHEIM-ZONDEK TEST

Type of reaction.	Biological changes in test animals.	Hormones in test fluid.	State of chorionic elements in tissues of patient.	Clinical diagnosis.
Simple positive—(Urine in dilution up to 1-10.)	Uterus: hypertrophy of walls. Distension of cavity. Ovary: ripening of follicles. Follicular hæmorrhages. Luteinisation.	Œstrin present. Prolan present.	Normally active.	1. Normal pregnancy. 2. Ectopics with active chorionic elements. 3. A few cancer patients.
Simple positive—(Urine in dilution greater than 1–10.)	Ditto.	Ditto.	Abnormally active.	1. Hydatidiform mole. 2. Chorion epithelioma.
Simple negative.	Nil.	Nil.	Absent or inactive owing to degeneration of placenta.	1. Non-pregnant states. 2. Pregnancy with intrauterine death of fœtus. 3. Ectopic pregnancy with dead or inactive placenta.
	Nil.	Nil.	Present but relatively inactive.	1. Impending abortion. 2. Onset of labour with dead fœtus.
Modified results—First type ..	Uterus: distended with secretion. Not hypertrophied. Ovary: nil.	Œstrin present. Prolan absent.	Absent.	1. Natural menopause. 2. Artificial menopause. 3. Genital tumours.
Second type ..	Uterus: hypertrophy of wall. Not distended. Ovary: follicular ripening *only*. No hæmorrhages or luteinisation.	Œstrin present. Prolan A present.		

Tanner attempted to devise a test for pregnancy based upon the temperature of the vagina which in non-pregnant women he found to vary between 97·6°–99°, but in pregnancy to be never less than 99° after the first month.

BLOOD TESTS

Sedimentation test (*Fahraeus*).—1 c.cm. of the patient's citrated blood is introduced into a special calibrated upright tube; allowed to stand and the length of time required for the red cells to pack below the 18 mm. mark is noted. The normal standard time is 120 minutes, but in early pregnancy this figure is supposed to be much reduced. This phenomenon has found its greatest use in the prognosis of gynæcological infections and pulmonary tuberculosis, but has proved itself to be entirely worthless in the diagnosis of early pregnancy, for which purpose it was originally conceived by Fahraeus.

Erede's anaphylactic reaction.—This author suggests that the "fœtal proteins" in maternal blood should cause an anaphylactic reaction in smooth muscle when perfused through the uterus of a sensitive virgin guinea-pig. No experimental work has been carried out to substantiate this theory.

Dienst reaction.—2·5 c.cm. of the patient's diluted serum is mixed with 1·25 c.cm. of a 33 per cent. sodium hydroxide solution. The mixture is shaken and 20 drops of copper sulphate added. The appearance of a blue supernatant ring is supposed to be diagnostic of pregnancy, but no confirmation of the value of this test has yet been established.

Bercovitz reaction.—5 c.cm. of the patient's blood are withdrawn and rapidly centrifuged. A few drops of clear serum are instilled into the conjunctival sac of the patient to be tested. Dilatation or contraction of the pupil denotes a positive result. In 68 pregnant women a positive result was obtained in 80 per cent., whereas in 72 non-pregnant women, none gave a positive reaction.

Costa's novocain-formalin reaction.—To 1·5 c.cm. of 2 per cent. novocain in citrated saline solution, add three drops of blood to be tested, centrifuge and add 1 drop of pure formalin; a grey precipitate appearing within 15 minutes is considered to be diagnostic of pregnancy. The reports on several cases show that normal blood will react positively within 3 to 15 minutes, and that infections and toxic conditions also give a positive result.

Binz, who was the first to use mice as a test object, injected serum from pregnant women and noted the development of the animal's uterus.

PLACENTAL REACTIONS

Liepmann attempted to produce specific antibodies by the injection of placental protein into rabbits, in the hope of developing a serological test for pregnancy similar to the Wassermann.

Abderhalden reaction.—This test is based upon the supposition that specific placental ferments are normally present in the blood of pregnant women, and that a reaction will occur when the serum is brought into contact with an extract of fresh placenta. Here is a recent estimation of the value of the test by Smith and Shipley: "While the natural ferments present in serum are somewhat increased, there is no evidence that a specific ferment exists in pregnancy." And further "the large number of positive results on the serums of men and non-pregnant women proves the test to be of no value for the diagnosis of pregnancy." Moreover, the actual technique of the test is so complex as to require an unusual degree of serologic skill in its performance.

Engelhorn and Wintz.—The test consists of an intracutaneous injection of placental extract; the appearance of localised redness and swelling indicates a positive reaction.

URINARY TESTS

Frank and Nothmann.—Glucose, 100 g., is given to the patient on a fasting stomach: in pregnancy, glycosuria without hyperglycæmia will appear within the course of two hours. This reaction occurs with fair constancy during the first three months of pregnancy, but is not completely reliable, and in all cases a negative result is obtained immediately after the death of the fœtus or the separation of the placenta.

Phloridzin test (*Kamnitzer and Joseph*).—Phloridzin, a glucoside derived from the bark of the domestic apple tree, is a favourite drug for inducing a lowered kidney sugar threshold in laboratory animals. Since the kidney threshold is reduced by the pregnancy itself, it should be possible to produce a pregnancy glycosuria relatively more easily in pregnant than in non-pregnant women and the authors claim to have had fairly constant results.

Novak and Roubitschek adrenaline test.—10 g. of glucose are given on a fasting stomach and at the same time 0·5 mg. of adrenaline is injected hypodermically. The appearance of glycosuria within two hours is stated to be diagnostic of pregnancy, but the results of a large number of experiments have proved to be inconstant.

It will be seen that most of these tests are simply of historic interest and that none of them can lay claim to even a moderate degree of accuracy. The methods now to be described belong to a different category, for they give a correct result in over 95 per cent. of all cases.

Hormone Reactions

The biological tests with which the names of Aschheim, Zondek,[25] Friedman,[26] and Brouha[27] are associated depend upon the presence of certain hormones in the urine of pregnant women. Various names have been given to these hormones, but for practical purposes they may be divided into two types:—

Anterior pituitary hormone (prolan: rho factor) divided by most authorities into prolan A and B.

A follicular hormone (œstrin: folliculin: theelin).

Properties of prolan.—The impure hormone can be obtained from the urine of pregnant women by precipitation with alcohol. After drying it appears as an amorphous powder which is readily soluble in water, but insoluble in alcohol and lipoid solvents. The hormone is sensitive to heat and although it may resist a high temperature for a short time, it is invariably destroyed by prolonged boiling.

Distribution of prolan A and B.—These hormones are present in varying degrees of concentration in different parts of the body, and especially in the anterior part of the pituitary gland of all mammals and the placentæ of human beings and some mammals. It is also found in the urine under certain conditions which include pregnancy, after the menopause, hydatiform mole, chorion epithelioma, some cancers, and the urine of men suffering from testicular teratomata.

The injection of prolan into sexually immature animals is rapidly followed by signs of activity in the genital organs which display ripening of the Graafian follicles, follicular hæmorrhages and luteinisation in the ovaries, and hypertrophy in the walls of the uterus. All these changes are due to the action of this hormone upon the gonad, and not to any direct effect upon the uterus, because they do not occur in castrated animals; hence prolan is said to be gonadokinetic and not uterokinetic in function.

Properties of œstrin.—Œstrin is a ketomonatomic alcohol and has a crystalline form. It is insoluble in alcohol, but soluble in water and lipoid solvents. It is thermostable and capable of resisting temperatures up to 200° C.

Distribution of œstrin.—A great deal of evidence has accumulated to show that œstrogenic substances are widely distributed throughout the animal, mineral, and vegetable kingdom, but their main source of supply is the urine of pregnant women (especially during the last half of gestation), the ovaries (follicular fluid) of all mammals, and the placentæ of women and animals.

Biological action of œstrin.—Tests for œstrin depend upon the fact that their injection into an ovariectomised or sexually immature animal (e.g., mouse) will produce œstrus or rut. The state of œstrus or heat is accompanied by a thickening and cornification of the epithelial layers of the vagina and by the appearance of non-nucleated squamous epithelial cells in the vaginal discharge. This characteristic reaction forms the basis of the so-called smear technique by which the presence or absence of œstrus may be determined by examining a smear taken from the vagina of the animal in question. In addition to the vaginal discharge, the uterus of the treated animal becomes distended by secretion and hyperæmic also, but this œstrogenic reaction differs qualitatively from that which follows the injection of prolan. For prolan produces hypertrophy of the walls of the uterus, and it does so indirectly by stimulating the ovary into the production of uterokinetic substances, whereas œstrin has no action upon the gonad but acts directly upon the uterus itself setting up active secretion of the glandular elements and so producing distension of the walls of the uterine cavity.

APPLICATION OF THE HORMONES TO THE DIAGNOSIS OF PREGNANCY

The modern biological test for pregnancy is based upon the following argument. (1) In pregnancy and certain other conditions an excess of prolan and œstrin appears in the blood and urine. (2) This excess of hormone is due to the presence of active chorionic elements in the tissues of the patient and it disappears from the urine when the chorion becomes degenerate or inactive. (3) The injection of these hormones is followed by characteristic and easily recognisable changes in the genital organs of sexually immature mice. (4) These genital reactions afford a means of determining the presence (and identity) of hormones in the fluid injected into sexually immature animals and thus to prove or disprove the existence of active chorionic tissue in the patient from whom the urine has been taken. The milestones which have marked the way towards the production of the present technique employed for this purpose are :—

Stockard and Papanicolaou [28]	1917	Described smear technique for determining rut in guinea-pigs.
Long and Evans [29]	1922	Applied the same technique to rats.
Allen [30]	1922	Applied the same technique to mice.
Binz	1925	Was first to use mice as a test object. Injected serum from pregnant women and noted development of the animal's uterus.
Aschheim and Zondek	1928	Showed that pregnant women's urine produced the same effect as implanted pituitary.
Philipp [31]	1929	Showed that placenta produced the same effect as pituitary and discredited this gland as the only source of hormone.
Friedman	1930	Developed the technique of the rapid rabbit test for pregnancy.

METHODS

Since the publication by Aschheim and Zondek of their original technique for the diagnosis of pregnancy from the urine, these authors have revised and improved their own procedures and other workers have described a number of modifications. The method in use at the Liverpool Pregnancy Diagnosis Station is as follows. Half a cubic centimetre of early morning urine is injected into four immature female mice weighing between 7 and 12 g. each. The injections are repeated twice daily until five doses have been given. The mice are killed 96–100 hours after the first injection and their genital organs are examined.

CLINICAL INTERPRETATION OF RESULTS

For the purpose of clinical interpretation the reactions may be grouped under three headings: simple positive, simple negative, and modified.

Simple positive results showing typical ovarian and uterine changes are due to the combined action of prolan and œstrin and they indicate the presence of active chorionic elements in the tissues of the patient, but such a result does not necessarily mean that the patient is normally pregnant or that she is pregnant at all, for it is well known that the chorion is active in pregnant women suffering from hydatidiform mole and also in non-pregnant women with certain tumours. Indeed in such cases the chorion displays a pathological activity, and it is not surprising to find that the urine contains a great excess of hormone and produces a typical positive reaction when diluted before injection into the animal. This quantitative test employing diluted urine should always be asked for by the clinician who suspects the presence of either of these two conditions.

Simple negative results are obtained when both prolan and œstrin are absent from the test urine. Clinically this result indicates the absence of chorionic activity, but it does not establish the absence of pregnancy. For just as the activity of the chorion may be enhanced by certain pathological conditions, so may it be depressed by other complications of the pregnant state, such as intra-uterine death of the fœtus, in which the placenta is degenerate or partially separated from the wall of the birth canal. These hormonic reactions are therefore an expression of chorionic activity and not merely a test for the presence or absence of pregnancy; and unless this fact is borne in mind, the scope of the Aschheim-Zondek test cannot be appreciated and the laboratory results may be actually misleading. But when due care is taken to correlate the clinical with the laboratory findings, the interpretation of the results is almost uniformly successful and it will afford immense help to the clinician both for the diagnosis of pregnancy itself and also for the recognition of many of its complications.

The necessity for care in the interpretation of results is emphasised still further by the occurrence of atypical reactions that are neither wholly positive nor completely negative.

Modified reactions.—The first type of modified result is one in which the experimental animal shows a distended uterus but no change in the ovary after injection of the test fluid. Our attention was first drawn to this phenomenon by its appearance in the course of the routine tests carried out at the Liverpool Pregnancy Diagnosis Station. Careful investigation showed that this reaction was not merely a chance association, but was the constant result of injecting urine obtained from patients suffering from threatened or incomplete abortion. Further experiments proved this reaction to be due to the presence of only one hormone in excess in the test urine—namely, œstrin. In a patient with a dying or degenerate placenta, it

therefore appears that œstrin is excreted in the urine for a longer time than prolan and that the excretion of such urine (i.e., containing œstrin, but no excess of prolan) is diagnostic of threatened or incomplete abortion.

The second type of modified reaction is one in which the experimental animal shows hypertrophy of the walls of the uterus, but only partial activity (that is to say follicular distension but neither hæmorrhage nor luteinisation) in the ovaries. This result is produced by the injection of urine from women at the menopause or from patients with genital tumours and after castration, and there is no doubt in our minds that it is due to the presence of one of the prolans (and the absence of the excess of œstrin) in the test fluid.

These modified reactions show that under certain conditions there is a differentiation between the excretion of prolan and the excretion of œstrin, and they support the view that further research along these lines will not only enlarge our general knowledge of the hormones but also increase the value of their particular application to the diagnosis of pregnancy.

In order that these reactions may be compared with each other and also with their respective clinical conditions, we have arranged all of them comprehensively in Table VI.

Conclusions

1. A definitive diagnosis of early pregnancy is beyond the powers of the unaided clinician.

2. Radiological methods cannot solve this problem before the fourth month of gestation.

3. The Aschheim-Zondek test gives a correct result in more than 95 per cent. of cases and is undoubtedly the most accurate method at present available for the differential diagnosis of early pregnancy and many of its complications.

4. For a correct interpretation of this test the experimental findings must be correlated with the clinical condition of the patient.

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CEREBRAL VASCULAR ACCIDENTS UNASSOCIATED WITH CARDIOVASCULAR DISEASE

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(WITH ILLUSTRATIONS ON PLATE)

Of the acute lesions of the brain, vascular accidents undoubtedly constitute the majority. When as is commonly the case they occur in patients with obvious cardiac or vascular disease the diagnosis and pathogenesis are seldom in doubt. But from time to time one encounters in healthy young adults acute cerebral disturbances having all the general characteristics of vascular accidents. The onset is sudden, the symptoms rapidly reach their climax, and subsequently, if the patient does not die, gradual recovery takes place leaving some degree of permanent damage. Yet no evidence of cardiac or vascular disease can be found and the precise pathology usually remains in doubt.

The following four cases illustrate this type of disorder.

FOUR CASE RECORDS

Case 1.—Male, aged 33; golf club steward. Admitted on Nov. 24th, 1932, complaining of an attack of weakness down his right side and difficulty in vision.

Past and family history.—He had always enjoyed good health, and had served in the army during the war and in Egypt for six months after it. He had had no illness of note and had been continuously employed in the same post since 1919. He denied venereal disease. He was married; his wife was in good health; there were no children.

History of present illness.—On Sept. 21st, 1932, while at work, he had a sudden attack in which he felt dazed but did not completely lose consciousness. He was aware of bright dazzling lights in front of his eyes, but there were no other symptoms. The attack lasted an hour or so, and after a week in bed he returned to work in apparently good health. One month later, when walking home, he again experienced flashes of light in front of his eyes, tended to walk towards the right, and would have fallen had he not had support. In the course of some minutes he became unconscious, and on recovery several hours later he felt numbness and weakness in the right arm and leg, and he was unable to see to the right side. For some days he had difficulty in speaking and in understanding language, but did not complain of headache. After three weeks in a local hospital he was admitted to St. Thomas's Hospital.

On *examination* he was a healthy, well-developed man of average proportions. Pulse, temperature, and respiration were normal. His speech was deliberate and a little fastidious, but he had no difficulty in naming objects, in appreciating spoken language, or in reading and writing. His optic fundi and visual acuity were normal; there was a right-sided homonymous hemianopia, with slight sparing of the inferior quadrant in the left eye near the vertical meridian. The pupils were slightly irregular but reacted normally to light. The external ocular movements and the other cranial nerve functions were normal. Except for slight tremor of the outstretched hands the motor system was normal in all respects, and careful examination failed to reveal any weakness or incoördination in the right arm or leg. The tendon reflexes in all extremities were abnormally brisk, especially on the right side. The abdominal reflexes were diminished equally on the two sides, and the plantar reflexes were both flexor. There was no defect in cutaneous or deep sensibility.

His apex-beat was palpable in the fifth space 3½ in. from the midsternal line, and the cardiac sounds were

normal. The peripheral arteries were normal to palpation, and the blood pressure 130/90. The retinal vessels were not thickened. His lungs and abdominal organs appeared to be healthy. The urine was normal.

His cerebro-spinal fluid was under an initial pressure of 180 mm. of fluid, and was slightly yellow in colour. There were 3 leucocytes per c.mm. and occasional red cells. The total protein was 0·035 per cent., and the

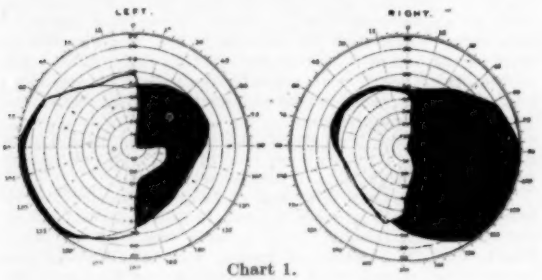


Chart 1.

Wassermann reaction negative. The blood Wassermann reaction was also negative. Clinical and X ray examination of the skull showed no abnormality. Perimetric examination showed a right homonymous hemianopia with partial sparing of the sectors adjacent to the vertical meridian in the lower quadrants. (Chart 1.)

Subsequent history.—From the time of his admission the patient's hesitance in speech steadily improved, and no other symptoms or signs were elicited. He was discharged on Dec. 12th, 1932, and has been seen at regular intervals since. For a time his friends noticed that he became incoherent in his speech from time to time, particularly if hurried, and was inclined to wander from one subject to another. This gradually improved, and when last seen in December, 1933, he was at his normal work, with no apparent abnormality except the right homonymous hemianopia which had remained completely unchanged since the time of admission.

CASE 2.—Male, aged 39; clerk. Brought to hospital because of loss of speech.

Past and family history.—His previous health had been extremely good and apart from an attack of shingles one year previously he had not consulted a doctor for many years. He was not liable to headaches. Venereal disease denied. He came of a healthy stock; he was married; there were no children.

History of present illness.—On August 27th, 1933, he left his home quite well in the morning, and at 1.30 P.M.

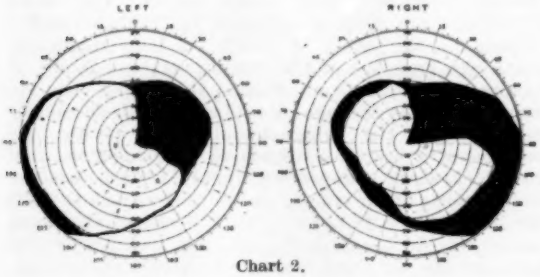


Chart 2.

he left his office and did not return. When his wife returned home at 6 o'clock that evening she found him in bed, delirious and talking "complete rubbish." He appeared to be in severe pain on the left side of the head and at the back of the neck. He vomited, but was not incontinent, and no weakness was noted. He passed a very restless night, and for the next three days remained in much the same condition, but the headache gradually diminished.

On *examination* on Sept. 1st, 1933, the patient was a healthy looking man of good physique, with normal pulse, temperature, and respiration. Mentally he was confused and bewildered, but attempted to coöperate well. His spontaneous utterances were very disjointed, and although he was able to make himself understood in simple language, he broke down completely over more complicated propositions and used wrong words. He was unable to name common objects. He obeyed simple spoken commands but was confused by more complex ones, and was quite unable to read or write.

His visual acuity and optic fundi were both normal. His visual fields to confrontation tests showed a right homonymous upper quadrantic hemianopia. The pupils and external ocular movements were normal, as were the functions of the fifth cranial nerve. There was very slight right facial weakness, but in other respects the cranial nerve functions were normal. The right arm tended to fall away slightly when outstretched but there was no change in tone, power, or coördination. The legs were normal. The tendon reflexes were brisk and equal on the two sides; the abdominal reflexes were diminished on the right, and the plantar reflexes were both flexor. Sensation was normal.

His apex-beat was in the fifth space ½ in. inside the left nipple line, and the cardiac sounds were normal. Blood pressure 130/80. There was no evidence of past or present ear disease.

He was admitted to hospital on Sept. 2nd, 1933, when the physical signs were confirmed and perimetric examination showed a clear-cut right upper quadrantic hemianopia reaching the fixation-point. (Chart 2.) Lumbar puncture gave a slightly yellow fluid without evidence of increased

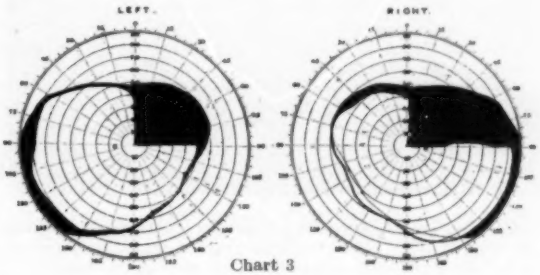


Chart 3

pressure, although this was not actually measured. The total protein was 0·035 per cent., and there were 22 mononuclear cells per 100 c.mm. The Wassermann reaction was negative in both blood and fluid. Clinical and X ray examination of the skull showed no abnormality.

Course of illness.—During the next two weeks his headache gradually disappeared and his aphasia lessened. The weakness of the right face and instability of the right arm could no longer be detected, but the visual fields remained unchanged. He has been seen at intervals of three months since and improvement has continued. In November, 1934, he still had some hesitance in speech and difficulty in appreciating complicated statements, but had returned to work and was able to read and write, though not as quickly as formerly. His visual fields were unchanged, but there were no other physical signs.

CASE 3.—Female, aged 32; widow. Attended hospital on July 25th, 1934, on account of fits.

Past and family history.—She had always been a healthy woman, and had never suffered from headache. She came of healthy stock. In December, 1932, Cæsarean section had been performed for her only pregnancy.

History of present illness.—In December, 1933, her husband died suddenly, and on the way back from his funeral she collapsed, vomited, and became unconscious, with stertorous breathing and double incontinence. She was nursed at home for two weeks, and as consciousness returned she talked rubbish and was unable to recognise her intimates or to feed herself. She has no recollection of this stage of her illness. She was admitted to the London Hospital on Feb. 16th, 1934, and the following notes have kindly been supplied: "She was unemotional

and appeared to have normal intelligence. There was slight dysphasia with inability to read. The right side of the face showed slight weakness and there was dulling of sensation over the centre of the face. The optic fundi were normal, and there was a right homonymous hemianopia. Power, tone, and reflexes in all the limbs were normal. Her cerebro-spinal fluid was normal in all respects. The Wassermann reaction was negative in the fluid and blood." She was discharged from the London Hospital on March 29th, 1934, with a general improvement in her condition. After discharge she gradually got better but still had difficulty with her speech and was often unable to find the right word. Since then she has had three epileptic fits. She has a short warning before loss of consciousness and in the fit goes blue, froths at the mouth, and is incontinent. She complains of no headache.

On *examination* on July 25th, 1934, her speech was hesitant and there was considerable delay in naming objects. She was able to appreciate simple spoken language, but had great difficulty in reading and writing as "I cannot remember what the words mean." Her appearance was healthy. The optic fundi and visual acuity were normal. There was a homonymous right upper quadrantic hemianopia to confrontations tests, which was confirmed on the perimeter. (Chart 3.) The pupils, ocular movements, and other cranial nerve functions were all normal. There was slight increase of tone in the right arm which was slightly unstable when held outstretched, and the right hand-grip was not quite as powerful as the left. Motor functions of the legs were normal. The tendon reflexes were brisker on the right side than the left; the abdominal reflexes were diminished equally on both sides, and the plantar reflexes were flexor. No defect of cutaneous sensation could be detected, but there was slight defect of postural sensibility in the right hand.

The heart was not enlarged; the cardiac sounds were normal and the blood pressure 145/90. The urine was normal. The blood Wassermann reaction was negative.

Subsequent course.—Since that time she has gradually improved, but her speech is still defective, and the visual fields have remained unchanged.

CASE 4.—Male, aged 35; traveller. Attended hospital on August 30th, 1933, complaining of inability to speak or to write properly, giddiness, and pain in the head.

Past and family history.—He had been healthy up to 1916 when he had a "heat stroke" in France in which he was unconscious, but of which he was unable to give any further details. He denied venereal disease. In February, 1933, he had a "stroke." He came downstairs in his normal health one morning and went to the lavatory. After defæcation he felt that his tongue had stuck to the roof of his mouth, and when he tried to whistle he was unable to do so. He felt sick and queer, but was able to walk to the kitchen, but his hands felt very weak, especially the right. He was not unconscious and there was no fit, and within half an hour he was well again except for pain over the left eye. He came of healthy stock, and had been twice married. His first wife died of endocarditis. There were two healthy children of the second marriage.

History of present illness.—One morning two weeks before his first attendance, when apparently in normal health, he bent down, coughed, and felt giddy and staggered. He did not actually lose his speech, but it became indistinct. He vomited. The right arm and leg became useless although not powerless; he stated "they would not do anything I wanted." Since that time the symptoms had gradually improved, but his speech was still indistinct, although he had no difficulty in selecting the correct words, and at no time had experienced any difficulty in understanding spoken or written language. His writing was shaky and slower than normal. The right arm and leg had gradually improved, but remained shaky. His eyesight, hearing, taste, and smell were all unaffected. He had had several very severe frontal headaches since the onset of symptoms, which were gradually lessening. He was right-handed.

On *examination* his general appearance was healthy. His mental state was normal, and there was no aphasia. His speech was a little hesitant with occasional slurring of the syllables. The optic fundi, visual acuity, and visual fields were all normal. The pupils were a little irregular in outline but reacted normally to light, the right being slightly larger than the left. External ocular movements were normal. There was no nystagmus. There was slight weakness of the right side of the face. In other respects the cranial nerve functions were normal. The right arm, and to a less extent the right leg, showed marked hypotonia and signs of cerebellar incoördination, with no appreciable loss of power. In walking the right arm hung motionless by his side. The tendon reflexes were brisk, slightly more so on the right side. The abdominal reflexes were slightly diminished on the right side, but both plantar reflexes were normal. Sensation was normal throughout.

His heart was not enlarged, and the cardiac sounds were normal. The blood pressure was 140/90. The urine was normal. No other signs of disease were found.

The cerebro-spinal fluid was clear and colourless. The pressure was not measured, but did not appear to be abnormally increased. Total protein was 0·02 per cent. There were 3·75 cells per c.mm., and the Wassermann reaction was negative in the cerebro-spinal fluid and the blood. Clinical and X ray examination of the skull were both negative.

Since discharge from hospital he has steadily improved, and the incapacity of his right arm and leg has gradually lessened. When last seen in April, 1934, he still complained of occasional frontal headache when tired. His speech was still a little indistinct, and nystagmus was present on full deviation of the eyes to the right and to the left. In other respects the cranial nerve functions were normal. Signs of cerebellar incoördination in the right limbs were still present but were much less than formerly, and he was able to return to work.

In these cases it is difficult to avoid the conclusion that some form of vascular accident had occurred, and yet in none of them were the usual causes of cerebral embolism, thrombosis, or hæmorrhage present. In each case the sudden onset was suggestive of hæmorrhage. In two cases (Nos. 3 and 4) the attacks occurred under circumstances in which it might be supposed that the systolic blood pressure was higher than usual. In the absence of any evidence of cardiovascular disease it seems probable that the vascular disturbance had occurred in or around some pre-existing local abnormality.

Amongst the best known vascular anomalies giving rise to cerebral hæmorrhage are the congenital aneurysms whose clinical and pathological features have been fully discussed by Fearnsides,[1] Symonds,[2] Forbus,[3] Green,[17] and many others. But these structures are usually situated on the component vessels of the circle of Willis, or less frequently upon the branches of the middle cerebral artery at points of bifurcation. When they give rise to hæmorrhage by leakage or rupture the blood usually escapes into the subarachnoid space giving rise to general symptoms suggestive of meningitis, and such focal signs as appear commonly depend upon the involvement of the cranial nerves as they pass to their foramina of exit from the skull. It is true that such aneurysms do occasionally give rise to intracerebral hæmorrhage, but these cases are relatively uncommon. In cases of leaking aneurysms the cerebro-spinal fluid, if examined at an early stage, shows the characteristic combination of recently shed blood in large amounts with a canary yellow supernatant fluid which owes its colour to altered blood pigments.

In none of the cases quoted were meningeal symptoms and signs a prominent feature, and the physical signs pointed in each case to a well-defined intracerebral lesion. In Cases 1, 2, and 3 the combination of aphasia, homonymous field defects involving central vision and transitory sensory disturbance

pointed to lesions of the left temporal lobe, while in Case 4 the signs pointed to a destructive lesion in the right cerebellar hemisphere. Although the cerebro-spinal fluid was not examined immediately after the attack, in none of the cases was freshly shed blood found. In Cases 1 and 2 the faintly yellow discoloration of the fluid could equally well be explained as due to a previous subarachnoid hæmorrhage or to an intracerebral hæmorrhage at some distance from the ventricle or subarachnoid space. On the whole these features make it unlikely that these cases were due to the leakage of cerebral aneurysms.

It is well known that certain gliomata, especially of the more vascular type, may begin their clinical career by sudden disturbances in their neighbourhood suggestive of a hæmorrhage, although Oldberg [4] has recently shown that gross hæmorrhage into a glioma is rare, having occurred in only 3·7 per cent. of 832 cases analysed. But the benign course run by the cases here recorded makes it improbable that they were due to gliomata, especially as those growths which undergo sudden degenerative change are usually of a rapidly progressive order.

A CASE WITH POST-MORTEM FINDINGS

A more probable explanation of the nature of these lesions is suggested by the following case in which a full pathological investigation was possible.

CASE 5.—Female, aged 27. Admitted to hospital on March 20th, 1933, complaining of headache and unsteadiness of gait for seven weeks.

Past and family history.—Her previous health had been extremely good. She came of healthy stock. She was married and had two healthy children.

Present illness.—Seven weeks before admission the patient began to vomit in the early morning. The vomiting was associated with nausea which passed off later in the day, so that she felt well by the evening. About the same time she became unsteady in gait, and began to suffer from headaches, at first slight but of increasing severity and duration. The pain was generally occipital but radiated to the frontal region, and was associated with some dizziness and faintness, but no fits. Vomiting had ceased fourteen days before admission. Five days before admission she woke with the sensation that the left side of the face was swollen, and she developed a neuralgic pain in it. Two days later the left side of the face became paralysed, and subsequently she was conscious of a feeling of pins and needles over the distribution of the left fifth cranial nerve. At the same time she began to suffer from diplopia when looking in any direction, and from photophobia. Her left arm became "floppy" and useless, and the left leg became weak. Three weeks before admission she became unable to walk. Three days before admission she developed a roaring noise in the left ear shortly followed by complete left-sided deafness. No other symptoms were elicited.

On *examination* the patient was a healthy looking woman of normal mentality and speech. Her optic fundi, visual fields, and visual acuity were all normal. The pupils were normal, and external ocular movements full except for marked defect of external deviation of the left eye. Rotatory nystagmus and diplopia were present at rest, and the nystagmus was more marked on full deviation to the right and left and upwards. On opening the mouth the jaw deviated to the left. The corneal reflex was present on the right but absent on the left. Sensibility to pin-prick and cotton-wool was diminished over the distribution of the left trigeminus including the tongue. There was an almost complete left-sided facial palsy. Taste was lost on the anterior two-thirds of the tongue on the left side. There was complete deafness of nerve type in the left ear. On phonation the palate was drawn to the right side. Pharyngeal reflex was present on the right but absent on the left, and the tongue was normal. There was marked hypotonia and typical cerebellar incoördination in the left arm and left leg, but no loss of power on either side, and the functions of the right limbs appeared normal in all respects. The tendon reflexes in the arms were abnormally brisk; the knee- and ankle-jerks were very exaggerated on both sides. An incipient ankle-clonus was elicited on both sides. The abdominal reflexes were absent on the right and diminished on the left, and the plantar reflexes were both equivocal, but more extensor than flexor. Sensory examination showed diminution of sensibility to pain and temperature, and, to a certain extent, to light touch on the right half of the body especially in the leg. Vibration sense, sense of passive movement, stereognosis, and compass point discrimination were all normal. Her cardiovascular

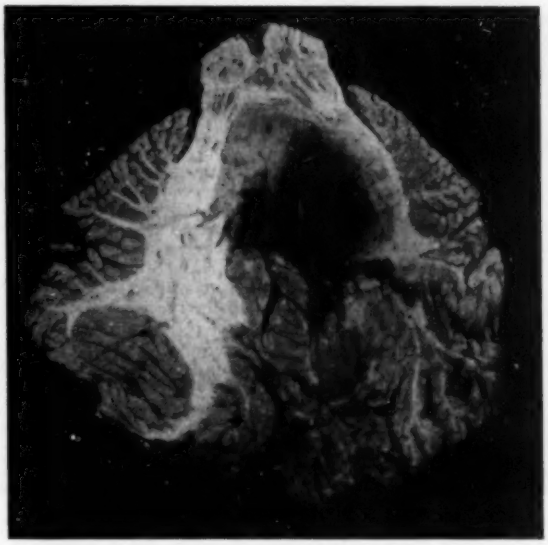


FIG. I. (Case 5).—Photograph of cerebellum and pons showing blood clot in the left brachium pontis with a large vessel entering it.

system, the urine, and the other organs were perfectly healthy on clinical examination.

Lumbar puncture showed a cerebro-spinal fluid under a pressure of 240 mm. of fluid. The fluid was clear and colourless. There was no excess of protein or cells, and the Wassermann reaction was negative. The blood Wassermann reaction was also negative. Clinical and X ray examination of the skull was normal.

Examination of the eighth nerve function showed an almost complete nerve deafness on the left side with normal hearing on the right and labyrinthine function was completely absent on the left side.

Course of illness.—Three weeks after admission the patient still complained of headache, giddiness, and double vision. The cranial nerve signs and cerebellar incoördination on the left side had become more marked, but the sensory disturbance on the right side of the body and the pyramidal signs had become less definite. A week later, apart from an equivocal right plantar response, the pyramidal signs had disappeared, and no defect in sensation could be elicited except on the left side of the face. A diagnosis of tumour of the left lateral recess was made.

On April 26th, 1933, a subtentorial exploration was performed. On retracting the left cerebellar hemisphere very intense hæmorrhage was encountered, which at the time was thought to originate from an injury to the lateral sinus. It was controlled by plugging, but necessitated the termination of the operation. The patient's progress was satisfactory for 14 days, but there was then a sudden rise of temperature followed by death in 24 hours.

At *autopsy* the brain was removed and hardened in 10 per cent. formalin. The only obvious abnormalities were trauma to the left cerebellar hemisphere at the site

of decompression, and slight displacement of the upper part of the medulla towards the right. The hemispheres were detached by section through the mid-brain and appeared normal in all respects. The cerebellum was sectioned by a horizontal incision through both hemispheres and middle peduncles cutting the pons obliquely. The medial three-fourths of the left brachium pontis and the reticular formation of the pons were occupied by a roughly spherical blood clot some ¾ in. in diameter (Fig. I.). The contained blood was laminated, dark red-brown in colour, and clearly marked off from the surrounding nervous tissue which had a faint brown discoloration. On naked-eye examination there did not appear to be a definite capsule. The clot extended ventrally as far as the transverse fibres of the pons; medially and dorsally it extended almost to the ependyma of the fourth ventricle, causing the floor of this cavity to be displaced upwards and medially so that the left half of its lumen was obliterated. Laterally the clot extended out to the main mass of white matter of the brachium pontis. The cut surface of the medulla showed the left restiform body and the left half of the floor of the posterior portion of the fourth ventricle to be swollen and discoloured, this abnormal area being continuous with the discoloured zone immediately surrounding the clot. Several large thin-walled blood-vessels could be seen passing between the clot and the cerebellar white matter, and another could be seen coursing along the medial aspect of the clot under the ependyma of the fourth ventricle.

Serial sections of the superior portion of the cerebellum and brain-stem were prepared and stained with hæmatoxylin and van Gieson, and also for the presence of free iron and elastic fibres.

On *microscopical examination* under ⅔ in. objective the clot was seen to consist of a uniformly staining mass with some nuclei at the periphery. It did not extend to the ependyma of the fourth ventricle but was everywhere separated by a thin zone of nervous tissue. The brain substance surrounding the clot was everywhere permeated by a dense network of small blood-vessels, many containing blood. (Fig. II. on Plate.) These were most numerous in the tissue immediately surrounding the clot especially upon its ventricular aspect, and the network gradually became less dense as the distance from the clot grew greater. The abnormal vessels extended into the white matter of the left cerebellar hemisphere where they were of larger calibre than in the pons. (Fig. III. on Plate.) The vermis and right hemisphere were normal. Under ⅙ in. objective it could be seen that the periphery of the clot and the surrounding tissue were densely infiltrated with inflammatory cells, chiefly mononuclear but with some polymorphs. In the nervous tissue were many compound granular corpuscles and accumulation of dark-staining pigment. The blood-vessels consisted of a layer of endothelium and a thin adventitia. Elastic staining did not reveal the presence of elastic tissue in any of them. Staining with Prussian blue revealed the presence of free iron in large amounts.

The pathological findings in this case show that a hæmorrhage had occurred into the substance of a pre-existing vascular abnormality of the left half of the pons and left middle cerebellar peduncle. This abnormality had the features of a telangiectasis and was not associated with any vascular abnormality elsewhere in the nervous system or in the skin or other organs.

DISCUSSION

It is usual to classify angiomatous tumours of the central nervous system into two broad groups :—

(1) *True neoplasms*, consisting of capillary and sinusoid hæmangiomatous tissue not to be distinguished histologically from similar growths in other organs. These may or may not be complicated by cyst formation, and are commonest in the cerebellum.

(2) *Angiomatous malformations*, which may be arterial, venous, or capillary. The last type has been appropriately termed a telangiectasis, and it is to this class that Case 5 apparently belongs.

The distinction between the two types of capillary tumour—using this term in its broadest sense—is stressed by Bailey and Cushing [5] who point out that the telangiectases have nervous tissue throughout their substance, separating the component vessels from one another, whereas true hæmangiomata have none and often exhibit the growth and clinical characteristics of a true neoplasm. Virchow, on the other hand, regarded them all as neoplastic, and in reading the literature on the subject it is not easy to be certain as to which type of structure the author refers, as the term capillary or cavernous nævus is usually employed. From the detailed descriptions, however, the cases subsequently referred to appear to have been telangiectases.

The accidental discovery of these small telangiectatic areas was first described by Virchow.[6] He pointed out, as was confirmed later by Oppenheim, that they were most common in the cerebellum and pons. It is stated by Uyematsu [7] that more than half the recorded cases were symptomless and found by accident, and by Loyez [8] that symptoms do not occur unless hæmorrhage or thrombosis takes place. Such a telangiectasis of the pons found in a patient dying of a glioma in the hemisphere is shown in Fig. IV. on Plate. Although subsequent writers agree with Virchow that these abnormalities are commonest in the contents of the posterior fossa, they have been described in all parts of the brain and may be single or multiple. Beitzke [9] records a case of telangiectasis in the temporal lobe, Sweasey Powers [10] one in the centrum ovale, Creite [11] a case of multiple telangiectases throughout the hemisphere, and Huebschmann [16] a case with 30 such areas scattered through the hemispheres and the cerebellum. Ohlmacher [12] described a patient who had two such areas in the pons and in whom death took place from hæmorrhage into a similar area in the cervical enlargement giving rise to a fatal hæmatomyelia.

A number of cases of sudden death from hæmorrhage into these structures are on record. Wirgman [13] reports the case of a healthy man of 19 who was found dead in a lavatory, in whom an autopsy revealed a hæmorrhage into the right cerebellar hemisphere and the subarachnoid space, which originated from a capillary "angioma" in the middle peduncle. The author specifically states that the component vessels were separated from one another by nervous tissue. Enders [14] reports the case of a woman of 60 brought in with symptoms and signs of a pontine hæmorrhage which proved to have originated from a pontine nævus the size of a lentil. Leyser [15] reports the case of a female epileptic of 20 who died with symptoms of pontine hæmorrhage which proved to be similar in origin.

Writers on the subject agree that these structures are small in size, varying from that of a pin's head to that of a lentil. The vessels are capillaries of varying calibre whose walls possess no elastic tissue, frequently show hyaline degeneration, and sometimes calcification. Areas of thrombosis are of frequent occurrence, and the surrounding nervous tissue shows gliosis and microglial activity.

Reference to the literature shows that it is not only capillary telangiectases which are liable to give rise to intracerebral hæmorrhage in apparently healthy persons but that similar vascular accidents may occur in association with malformations composed of larger vessels—i.e., arteriovenous angiomas. Unlike the capillary telangiectases which are commonest in the contents of the posterior fossa the arteriovenous anomalies appear to have a preference for the

DR. THOMPSON, MR. SOUTTAR, AND DR. HOWELLS: ANEURYSM TREATED BY WIRING

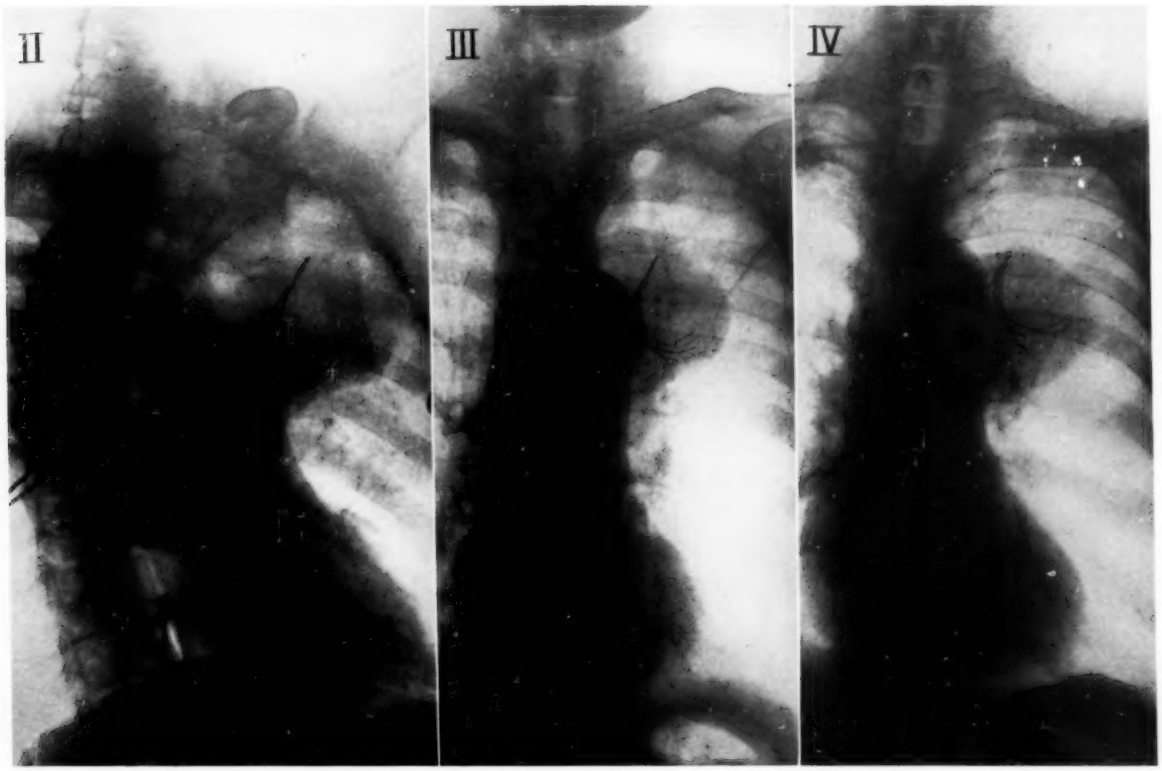


FIG. II.—Radiogram taken two weeks after operation (March 18th, 1931). Lateral view of the aneurysm showing the gold wire umbrella in position.
FIG. III.—Radiogram taken about two months after operation (May 4th, 1931) showing the gold wire umbrella inside the aneurysm.
FIG. IV.—Teleradiogram taken three years and three months after the operation (May 24th, 1934). The gold wire umbrella is still to be seen in position.

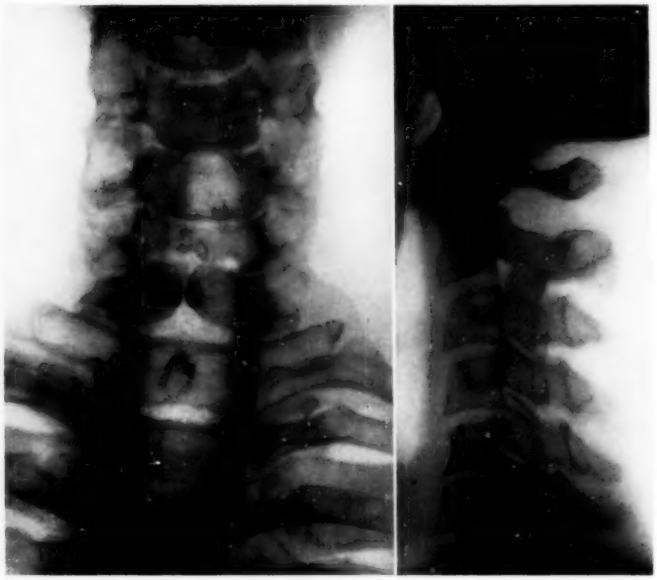
DR. ROBERTS: ACROMEGALY AND SPLANCHNOMEGALY

FIGS. I. and II.—Radiograms showing acromegalic hyperostosis and a large osteoma, with a well-defined margin, apparently growing from the falx cerebri.

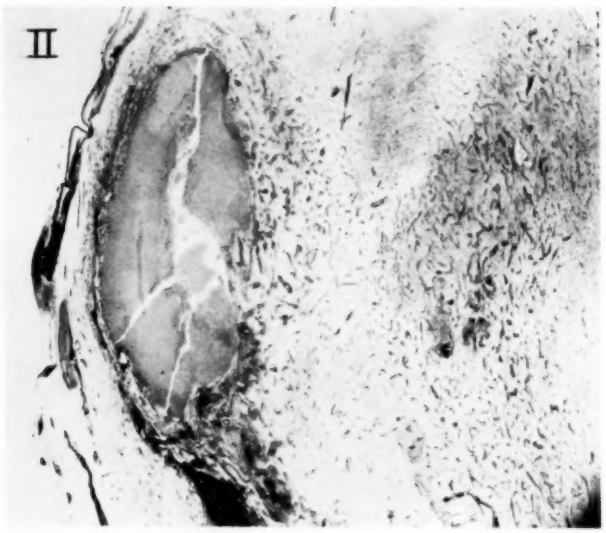
DR. PULVERTAFT: DUODENO-RENAL FISTULA

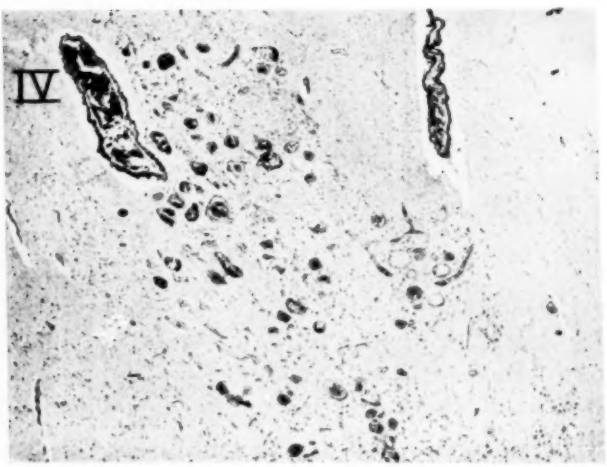
Radiogram showing scoliosis and renal calculi.

DRS. ASKEY AND COLLINS: SPINA BIFIDA



Radiograms of cervical region.





DR. ELKINGTON: CEREBRAL VASCULAR ACCIDENTS

FIG. II. (Case 5).—The haemorrhage under low magnification showing the surrounding capillary telangiectasis with dilated vessels on the ventricular aspect. (× 3½.)

FIG. III. (Case 5).—White matter of the left cerebellar hemisphere, showing diffuse capillary telangiectasis. (× 10.)

FIG. IV.—Telangiectasis of the pons found accidentally in a patient dying of a glioma of the left temporal lobe. (× 20.)

posterior part of the cerebral hemispheres. Gordon Holmes [18] reports the case of a woman of 30 who for six months before her death suffered from occipital headaches which on two occasions were associated with unformed visual hallucinations. After a headache of exceptional severity she developed suddenly a left homonymous hemianopia. Autopsy showed that the right occipital lobe was the site of an arteriovenous angioma which had given rise to a hæmorrhage destroying the depths of the calcarine fissure. Levine [19] records two very similar cases. The first was a healthy man of 39 who, after complaining of headaches for two weeks, became comatose and died with all the symptoms of a cerebral hæmorrhage. The second was an otherwise healthy man of 46 who had suffered from epilepsy for two years. After the last fit he sank into coma and died. In both these cases autopsy revealed an arteriovenous angioma (angioma racemosum) which had given rise to a fatal intraventricular hæmorrhage. In the first case it was situated on the surface of the left temporal lobe, and in the second on the surface of the left parietal lobe. In both the vascular anomaly consisted of a mass of contorted, worm-like vessels in the pia mater communicating with similar vascular channels in the underlying brain substance. Cushing and Bailey report the case of a healthy woman of 23 who died of an intraventricular hæmorrhage originating from venous angioma of the right occipital lobe.

Owing to their favourable outcome one can at present only speculate upon the pathology of the first four cases recorded in these notes. However, their close clinical resemblance to other cases in which post-mortem examination has been carried out makes it probable that they were caused by hæmorrhage into a vascular anomaly of the type of a telangiectasis or an arteriovenous angioma.

SUMMARY

(1) Attention is drawn to the occurrence of cerebral vascular accidents in healthy persons without cardiovascular disease, and four cases are described which are believed to be of this nature. (2) It is suggested that they are due to hæmorrhage into a pre-existing vascular anomaly. (3) A case in which such a hæmorrhage occurred into a ponto-cerebellar telangiectasis is described in detail.

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WILSON HOSPITAL, MITCHAM.—An annexe to this hospital has been opened by the wife of Mr. I. H. Wilson, the donor. The hospital was opened by the Princess Royal in 1928 to accommodate 32 patients. The enlargement, which cost over £15,000, will accommodate another 40 patients and the nursing staff.

SACCULAR ANEURYSM OF THE THORACIC AORTA

TREATED BY WIRING WITH COLT'S APPARATUS

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(WITH ILLUSTRATIONS ON PLATE)

THE insertion of wire as an aid to clotting in the sac of an aortic aneurysm has been known for many years, but of late it has fallen into disuse. The successful result of this method in an apparently hopeless case may induce a revival of interest. It was first introduced by Moore and Murchison (1864), who inserted 26 yards of iron wire into an aneurysm. Velpeau (1830) had previously attempted to achieve this object by transfixing an aneurysm with needles. In 1868 Ciniselli employed galvanopuncture and electrolysis by means of needles, and in 1879 Buressi and Corradi passed a constant current through annealed wire in the sac of an aortic aneurysm. Since then the treatment of intrathoracic aneurysm, particularly for the relief of pain, by wiring and the passage of an electrical current has often been attempted.

In 1900 Hunner reported 14 cases, of which eight were thoracic and six abdominal aneurysms, which had been treated by the insertion of a permanent wire and galvanism (Moore-Corradi method). A cure resulted in two, and the symptoms were definitely ameliorated in nine. Anders and Mann (1908) had a patient who was alive and well one year after two sacculated thoracic aneurysms had been treated by wiring, but less successful results have been recorded by Eastman (1906) and Tyson (1911).

After an extensive review of the subject Eshner (1910) formed the opinion that wiring and electrolysis should be confined to saccular aneurysms, and he reported two of his own cases who died within four weeks and eight months of the operation, respectively. Christian (1912) tabulated the results obtained in over 30 cases of thoracic aneurysm, and added to these one case of his own. He found that the average duration of life after the operation was 11 months, only four died within a week, and one lived 11 years, and since the operation was almost without risk, relieved the majority, and enabled some to return to work, he advocated its more frequent employment.

Two successful results after wiring and electrolysis were recorded by Lusk (1916) who expressed the opinion that it was important to administer antisyphilitic treatment after the operation. One of these was a man working normally four years after the operation and the other was able to live an active life until the aneurysm ruptured exactly four years later. Hare (1927) wrote in favour of this form of treatment and agreed with Eshner that only sacculated aneurysms were suitable for wiring, the more sharply defined the sac the better being the chance of a good result. He described two cases of intrathoracic aneurysm who died in about two months after the insertion of 15 ft. of gold wire and the passage of an electrical current. In a previous communication (1917) this observer emphasised the value of the operation in the relief of pain, which he had always succeeded in allaying or removing in no less than 27 cases before the operation was over.

The introduction of many yards of wire into the sac of an aneurysm is obviously not without danger, and it is almost impossible to be certain that it will

remain coiled inside the sac. In at least seven of the recorded cases the wire has escaped through the opening of the sac into the aorta, and since in addition the operation is undesirably prolonged by the passage of the electrical current it cannot be claimed that this method is entirely satisfactory.

COLT'S METHOD

In order to overcome these difficulties G. H. Colt devised a simple and efficient apparatus by means of which an expanding wire umbrella can be introduced into the sac with the maximum of speed and without risk of sepsis. The apparatus (Fig. V.) consists of one trocar and cannula 2 in. long (A); one trocar and cannula 4 in. long; two cartridges (B and C); two pistons (D), one long and one short; one wisp (E) packing to 2¼ in. containing 75 in. of wire, surface area 1¾ sq. in.; one wisp packing to 3½ in., containing 105 in. of wire, surface area 2½ sq. in.

The whole apparatus can be boiled in soda solution. The wisps should be boiled, unfolded, for half an hour, inserted backwards into the cartridges without allowing the wires to cross each other, and the loaded cartridges (C) boiled again. A note is made of the number of each cartridge and of the size of the contained wisp. The aneurysm is punctured in a direction estimated to be towards the opening of the sac and the trocar is withdrawn. Blood should spurt from the cannula. If no blood comes it is unsafe to proceed with the wiring. Withdraw the cannula until the distal end is just within the sac, attach the cartridge so that the free ends of the wires will enter first, insert the piston and push the wisp gently home. If the piston should stick when the wisp arrives at the junction of the cartridge and cannula, rotate the cartridge a little. Note the size of the wisp for future reference. When the larger cannula is used the larger piston must also be used. The apparatus also contains insulated instruments for the passage of electricity if necessary.

In support of his method Colt (1926) has justly claimed that, "It is now clearly proved that the dull gilt wisp is sufficient to initiate active clotting in a saccular aneurysm even in an actively syphilitic patient, and it is unlikely to project through the opening of the sac. The wire does not become dissolved or broken and appears to cause no trouble after many years. It would appear that the employment of electrolysis is not essential to start the clotting, and the experiments of Dawson Turner amply confirm this."

From published records it appears that Colt's apparatus has met with greater success in the treatment of abdominal than of thoracic aortic aneurysms.

Excellent accounts of its employment have been written by D'Arcy Power (1921), Colt, Wakeley, and Marshall (1926), and Wheeler (1916–33). Up to the year 1926, 21 cases had been treated with the apparatus, of which 14 were aneurysm of the abdominal and 7 of the thoracic aorta. Of the 14 cases of abdominal aortic aneurysm, 1 lived a year, 1 some months, 1 six weeks, and 8 died within nine days of the operation. The results in the remaining 3 were brilliant; Sir William Wheeler reported 2 of his cases, 1 of which lived nearly 18 years and the other for nearly five years after the operation; the other was Lawson's (1913) patient who lived for over ten and a half years.

The results in the 7 cases of thoracic aortic aneurysm were not so encouraging. One was alive and well almost six years after the operation (Power 1921, Colt 1926), and another died after three and a half years (Power 1921). Another patient died within nine months (Wakeley 1926), 1 within four months and 3 within 11 days of the operation (Power 1921). Wheeler (1933) has recently reported a further case of thoracic aneurysm treated by the same method, in which the patient died three months later from gradual leakage into the mediastinum and pleural cavity.

The successful employment of gold wire by Colt's method in the following case should draw attention to its value in suitable circumstances. The case is also interesting because the patient received a series of blows on the chest directly before the symptoms of an aneurysm appeared.

In spite of rest and antisyphilitic treatment the aneurysm was increasing in size, protruding between the ribs and reddening the skin, so that rupture seemed an imminent probability. Colt's umbrella of gold wire was inserted on March 4th, 1931, with the result that the tumour sank back into the chest and the severe pain was relieved, and the patient was able to resume his ordinary work. Since that time regular inspections of the chest have been made and the improvement has steadily continued, and when last seen on Dec. 19th, 1934, over three and a half years after the operation, the patient was almost free from symptoms and examination of the chest merely showed a very slight pulsation over the seat of the aneurysm. The presence of a positive Wassermann test showed clearly that the underlying basis was syphilitic but the onset of symptoms within a few days of receiving severe blows on the chest would point to the trauma being a predisposing cause.

CASE REPORT

The patient, a small, thin man, about 5 ft. 3 in. in height and weighing about 8 st., was admitted to the London Hospital on Feb. 1st, 1931. He was 51 years of age and had worked as a counterman in a small tobacconist's shop. On Dec. 17th, 1930, he had an altercation with his employer, who struck him three severe blows on the left side of the chest just below the collar bone, knocking him down to the ground on each occasion. Two days after this incident he began to get pain on the left side of the chest which was throbbing in nature and radiated into his back and left shoulder blade. The pain made him rock to and fro in bed, he was unable to lie on either side with comfort, especially on the right. A week or two later he noticed a swelling at the site of the pain where he had been struck, just to the left side of the upper part of the sternum. He complained of a slight cough and of bringing up tenacious sputum. There was, however, no hæmoptysis and no dyspnœa. The appetite was poor and the bowels rather constipated and he was losing weight, having lost 10 lb. in the last two months. He had no difficulty in swallowing and no huskiness of the voice.

Past history.—He denied ever having contracted syphilis. He had served in the war and suffered from mustard gas burns. In 1926 he had some dry pleurisy on the left side of the chest, and in 1930 he had an attack of influenza and bronchitis, but otherwise he had kept perfectly well until the onset of his symptoms in December, 1930. He was married and his wife was alive and well; she had one healthy child and had had no miscarriages.

On *examination* he was a small, thin, but healthy looking and active man. The colour was good but he complained bitterly of severe pain in the left side of the chest which passed round to the left shoulder and also to the left scapula. It was a throbbing or boring pain and the only comfortable position in which he could lie was on his back.

The radial pulses were equal in force and regular; the blood pressure was 140/80 mm. Hg and equal on both sides; the radial arteries were not thickened. The apex-beat was in the fifth space and in the mid-clavicular line. The heart sounds were normal except the second aortic sound which was rather increased. There was a swelling in the second left intercostal space about 1 in. to the left of the external border and expansile pulsation could be felt over this swelling. There was no alteration in his voice and no paresis of the vocal cords. The trachea was slightly displaced to the right and there was a definite tracheal tug. The chest movement was equal on both sides, but on auscultation there was very definite diminution in the breath sounds over the left upper lobe suggesting pressure upon the left bronchus.

Examination of the abdomen was negative, but he had a reducible right inguinal hernia. The pupils were equal and central and reacted to light and accommodation; no abnormality was found in any of the cranial nerves; the knee-jerks and ankle-jerks were present and equal and the plantar reflexes were flexor in type. The Wassermann reaction of the blood was strongly positive.

An orthodiagram of the heart was taken and the aortic knuckle was seen to be prominent. The left ventricle was not enlarged. There was a definite pulsating shadow to the left of the aortic knuckle which was clearly a saccular aneurysm of the aorta. X ray examination of the chest showed in the antero-posterior view a definite pulsating shadow continuous with the aortic knuckle (Fig. I.). There was slight pressure on the œsophagus where the aorta crossed it.

Treatment.—On admission to the hospital he was kept strictly at rest on his back and was given a mixture containing liquor hydrarg. perchlor. drachms 2, and potassium iodide grs. 10. This mixture, however, seemed to produce rather a severe attack of diarrhœa and its administration had to be suspended on Feb. 10th. On Feb. 6th he was given an injection of Novarsenobillon 0·45 g. and this was followed by a slight rise of temperature, up to 99° F. On Feb. 12th he was given a second injection of novarsenobillon 0·45 g. This was again repeated on Feb. 19th. After the second injection the pain was a little less and the patient seemed to improve, but towards the end of February the pain increased in intensity again, injections of morphia had to be given daily to relieve him, and the swelling increased in size and gradually involved the skin, causing a reddening over the lump. Expansile pulsation became more pronounced. The aneurysm was evidently a localised one with a comparatively small opening into the aorta. It was definitely saccular and in view of the increase in size, and the probability of imminent rupture it was decided to try the insertion of Colt's gold wire filigree.

On March 4th, 1931, Mr. H. S. Souttar operated. Novocain 1 per cent. was inserted as a local anæsthetic. The skin was pierced in the second left intercostal space with a tenotone, and the trocar and cannula were inserted. When the trocar was withdrawn the blood spurted from the cannula, but this was stopped by inserting the tube containing the Colt's wire umbrella. The gold wire wisp was then pushed into the aneurysm and the cannula withdrawn and the puncture sealed by collodion.

Further radiograms were taken on March 18th and May 4th, 1931 (Figs. II. and III.), and the umbrella was clearly seen in the centre of the aneurysm. After the insertion of the gold wire an intensive course of treatment was adopted to encourage clotting within the sac. Hæmoplastin 2 c.cm. was injected every day from March 11th to 20th. Calcium gluconate (Sandoz) 10 c.cm. was injected intramuscularly. The serum calcium on March 11th was 9·1 mg. per 100 c.cm., on March 24th 9·8 mg., and on May 12th 10·6 mg. On July 13th the serum calcium had fallen to 10·2 mg. After the insertion of the gold wire the condition of the aneurysm steadily improved, and the swelling retracted into the chest, the redness of the skin disappeared and the irritating cough improved. There was no question that there was an increase in the clot in the sac and a diminution in the expansile pulsation. He remained in hospital until the end of July, when he returned home. His employer settled his action against him for assault by the payment of a sum of money and he has been able to get a new post as a tobacco salesman.

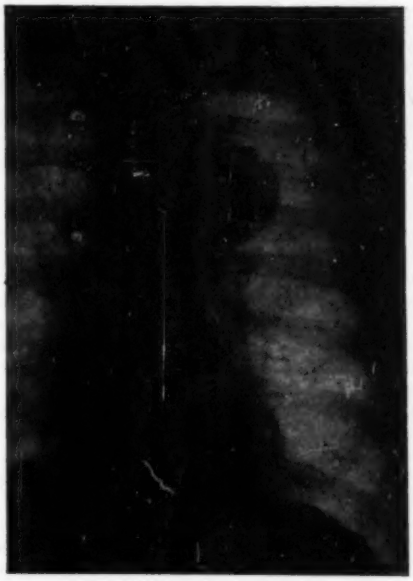

FIG. I.—Radiogram taken before the operation (Feb. 6th, 1931) showing a large saccular aneurysm arising from the descending arch of the thoracic aorta.

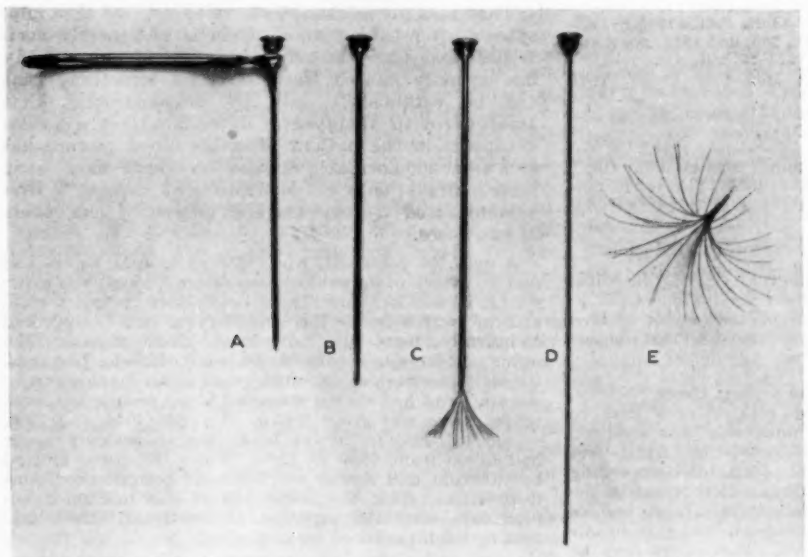

FIG. V.—Colt's apparatus for wiring an aneurysm. A full description is given in the text.

History since leaving hospital.—The patient has been under observation ever since and was last examined on Dec. 19th, 1934, that is three years and seven months after the operation. He works 11 hours a day in a tobacconist's shop, and has done this work efficiently for the last two years without any holiday. He states that he is a "new man" since the wire has been inserted, and apart from slight pain in the left upper chest with shortness of breath after exertion, he is free from any serious symptoms. Occasionally he is troubled by cough and mucoid expectoration in the morning. On examination it is evident that the swelling has considerably diminished in size. In the second left interspace a slight impulse can be seen and felt, and over this a soft systolic murmur

and an accentuated aortic second sound can be heard. The apex-beat was located in the fifth left intercostal space in the midclavicular line. The radial pulses were equal and regular. A tracheal tug was elicited. The percussion note was slightly impaired and the breath sounds diminished over the upper lobe of the left lung, indicating partial collapse. A teleradiogram taken on May 24th, 1934, showed a large saccular aneurysm passing anteriorly from the descending arch of the thoracic aorta with the wisp in perfect position in the centre of the aneurysm (Fig. IV.).

DISCUSSION

There can be no doubt that in this case the introduction of gold wire into the sac of the aneurysm produced coagulation within the sac, prevented its rupture, and has enabled the patient to continue an active life for the past three and a half years. An elaborate analysis by Colt (1927) shows that the average duration of life, after a thoracic aneurysm has been definitely diagnosed, is about two years, so that the effect of wiring in this case where the patient has been at work for over three and a half years and still remains in good health would seem to warrant a more general use of this method in suitable cases.

The indications for the use of Colt's gold wire wisps in cases of thoracic aneurysm appear to be as follows: (1) The aneurysm should be definitely saccular and not a mere general dilatation of the aorta. (2) The failure of a previous course of rest and antisyphilitic treatment to prevent increase in size of the aneurysm. (3) Involvement of the chest wall and reddening of the skin, suggesting imminent rupture of the sac. (4) Evidence of pressure on the œsophagus or left bronchus, especially if small quantities of blood have been expectorated.

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BATH ROYAL UNITED HOSPITAL.—This hospital has received a legacy of £6000 from Major-General T. F. Dunscomb Bridge in recognition of the benefit derived by Mrs. Dunscomb Bridge from a course of the mineral water treatment at Bath.

A VISIT TO PALESTINE.—The Green Cross Society, which exists to protect trees and flowers and to prevent the desecration of the countryside, has arranged for a small party to visit Palestine in April and May, leaving London on April 18th, and travelling via Marseilles and Cairo. Nine days will be spent in the country, with Jerusalem as headquarters, and besides visits to places of historic interest there will be expeditions to Zionist forests and fruit groves. Particulars may be had from the hon. secretary of the society at 47, Victoria-street, London, S.W. 1.

AGRANULOCYTOSIS DUE TO AMIDOPYRIN

AN EXPERIMENTAL AND CLINICAL STUDY OF SEVEN NEW CASES

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SINCE May, 1933, no less than 128 cases have been reported in which agranulocytosis developed after therapeutic doses of amidopyrin.* Seventy of them were fatal. Table I. summarises those recorded in the literature accessible to me.

TABLE I.—*Reports of Agranulocytosis Developing After the Use of Amidopyrin*

Date of publication.	Author.	Cases.	Deaths
May, 1933	Videbech [1]	1	0
June, ,,	Costen [2]	2	0
Nov., ,,	Watkins [3]	13	3
,, ,,	de Vries [4]	1	0
Feb., 1934	Holten, Nielsen, and Transbøl [5]	7	7
,, ,,	Jørgensen [6]	1	1
,, ,,	Zinniger [7]	2	2
March, ,,	Seemann † [8]	17	16
,, ,,	Siggaard Andersen [9]	1	0
,, ,,	Madison and Squier [10]	14	8
April, ,,	Randall [11]	1	0
,, ,,	Hoffman, Butt, and Hickey [12]	13	13
,, ,,	Larsen [13]	1	1
June, ,,	Rawls [14]	2	1
,, ,,	Zinberg, Katzenstein, and Wice [15]	1	0
July, ,,	Benjamin and Biederman [16]	1	0
,, ,,	Groen and Gelderman [17]	13	8
August, ,,	Corelli [18]	2	0
,, ,,	Fitz-Hugh, Jr. [19]	17	?
,, ,,	Knudsen [20]	1	0
Oct., ,,	Jackson, Jr. [21]	7	2
,, ,,	Moltke [23]	1	1
,, ,,	Johnson [22]	1	0
Dec., ,,	Fisher [24]	1	1
,, ,,	Cases reported in this paper	7	6
	Total	128	70

† These 17 cases are clear-cut and leave no doubt about the amidopyrin-intake. In 7 other cases the obtainable information said merely that the patients had taken amidopyrin, but the data were not precise enough to allow of any conclusion. In 12 cases no positive data about amidopyrin could be obtained.

That in a given case the development of agranulocytosis after taking amidopyrin is not merely accidental and that the administration of this remedy has actually caused the disease is something that can be established only by demonstrating that amidopyrin in therapeutic doses produces granulocytopenia in the patient after his blood picture has returned to normal. Studies on these lines have been carried out by Madison and Squier,[10] who demonstrated a very marked degree of leucopenia in two cases.

A man, 40 years old, who eighteen months before had had an attack of agranulocytosis (after Allonal) was given 0·30 g. of amidopyrin. Three hours later he had a chill, and in twelve hours the granulocytes had disappeared completely from the peripheral blood stream. The other patient was a woman, 34 years old, who had gone through an attack of agranulocytosis (after amidopyrin + Amytal) and had shown a normal blood picture for three weeks. She was given 0·45 g. of amidopyrin + 0·20 g. of amytal, and in twelve hours the granulocyte count had fallen from 6850 to 1200. From the curve plotted by Madison and Squier for the total granulocyte count it is evident that the original level was reached again four days after the ingestion of the drugs. Barbituric acid by itself produced no such effect.

* The drug is usually known in Great Britain by the trade name of Pyramidon.

Zinberg, Katzenstein, and Wice [15] have reported a similar case.

A woman, 46 years old, had been treated by them for pneumonia about a month previously, when the leucocyte count had been as high as 24,000, with 96 per cent. polymorphonuclears, and then subsided gradually to the normal level. It was then discovered accidentally that the leucocyte count and especially the granulocyte count were low—the patient having been given a single dose of amidopyrin 24 hours before. Fifteen days later she was given 0·325 g. of amidopyrin, with the following effect: seventy-five minutes after taking the drug she had a severe chill, lasting a quarter of an hour and followed by a rise of the temperature to 38·5° C. (oral). Later in the day she felt perfectly well. The leucocyte count fell from 8400 to 1300 in 2¼ hours after the amidopyrin was given. The granulocyte count fell from 5600 to 396 (24 hours after the amidopyrin), and three days later (i.e., four days after the amidopyrin) it had increased only to a little over a half of the initial value.

Benjamin and Biederman [16] have reported a particularly instructive case.

A patient who had recovered from an attack of agranulocytosis, presumably a sequel to the use of amidopyrin, was some time later given 0·65 g. of the drug. In less than 24 hours the typical symptoms of agranulocytosis developed: fever, headache, nausea, sore-throat, swelling of the gums, and a big decrease in the number of granulocytes. Four days after the dose had been taken, the white cell count was normal again.

Finally, F. Corelli [18] has reported a similar case in which there was a distinct though less pronounced decrease in the granulocyte count after 0·40 g. of amidopyrin.

AUTHOR'S EXPERIMENT

In collaboration with the Öresund Hospital, Elsinore, I examined the effect of a single dose of amidopyrin on a patient who had gone through a previous attack of agranulocytosis.

At the beginning of last April this patient, a man aged 51, was suffering from neuralgia, and in six days was given a total of 1·20 g. of amidopyrin and 0·18 g. of diallylbarbituric acid. Each dose gave him a definite feeling of indisposition, but, as the doctor had prescribed it, he kept on with the treatment. After three days of this medication, his throat became very sore, and on the sixth day (April 7th) he was admitted to the hospital with severe agranulocytosis. Examination of the blood showed: white cells 400, granulocytes 0; red cells 4,970,000. After treatment with Detoxin and liver extract, given parenterally, the white blood count rose to 12,200 with 76 per cent. granulocytes on April 19th. On the following day he was discharged from the hospital, and on April 26th, May 17th, and June 24th the leucocyte count was normal.

On June 26th, in the morning, the blood count showed 9020 white cells with 63 per cent. granulocytes. The patient was then given 0·20 g. of amidopyrin by mouth, in powder form, and blood examinations were carried out as follows. On the first day, white cell count and differential count at intervals of half an hour; on the second day, the same counts at intervals of about one hour; on the third day, four times; on the fourth day, three times; and on the following days, once daily. Each differential count covered a total of 300 cells.

Besides the powerful effect on the leucocytes as described below, there were also some conspicuous changes in the condition of the patient, subjective as well as objective. As early as an hour after taking the drug he felt indisposed and had "shiverings" of the extremities, which were aggravated during the next six hours, turning into not particularly severe chills, in spells, for two hours. At the same time the temperature, which was taken every hour (Fig. 1), rose to 40·1° C., thereafter falling to about the normal level in nine hours. The sedimentation-rate of the blood corpuscles was at the height of the temperature 28 mm. in one hour; next day 26 mm.; third day 14 mm.; and fifth day 10 mm. While the temperature was at its highest, the urine gave a positive urobilin reaction even in dilution 1 : 50; next day it gave positive urobilin reaction in dilution 1 : 10; no albumin could be demonstrated in the urine at any time. During the night after the drug was given, the patient complained of very severe headache. After this, however, he felt perfectly well.

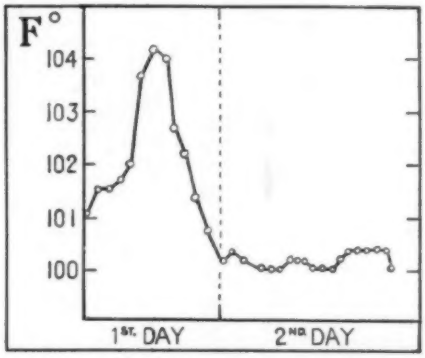

FIG. 1.—Patient's temperature during the first two days of the experiment.

The blood findings are recorded in Table II. and presented graphically in Fig. 2. The blood examination showed:—

(1) The *total white cell count* fell in 1½ hours from 9000 to 1900. Then, in the following 3 hours, there was an abrupt rise to 11,500; after this, the cell count fell off, at first rapidly and later more slowly, until it reached again a level of about 2000, for the second time within 24 hours after the administration of amidopyrin. Then there followed through the next eight days a gradual increase until the cell count reached 10,400, a little above the initial level, on the tenth day. During the next five days the cell count kept rather closely, except once, about the level of 9000.

The effect upon the granulocytes and the effect on the non-granulated mononuclear cells showed a very pronounced and protracted difference.

(2) The *granulocyte count* fell in the first 1½ hours from 5700 to 1450. After this fall there was a transitory rise (up to 11,350) which lasted till 4½ hours after administration of amidopyrin. Then there came a continuous fall until 24 hours after intake of the drug, when the granulocyte count reached its minimum, 1150. During the next ten days the granulocyte count kept very low, being fairly steadily between 1000 and a little over 2000. Not until the twelfth day did there come a new rise, reaching on the fourteenth day to the initial level. With the great transitory rise of the total white cell count the percentage of granulocytes increased very markedly, from 63 to 98⅔, so that the increase of the total white count at that point of time was due exclusively to the rise in number of the granular cells. There was noticed in the blood picture at the same time a marked shift to the left as the number of staff-nuclear cells increased from 6½ per cent. to 41 per cent. and several immature cells were seen, up to ⅔ per cent. myelocytes and 3 per cent. metamyelocytes. There was thus an out-

TABLE II.—*White Blood Count and Differential Count after 0·20 g. of Amidopyrin*

Day of illness.	Time.	Leucocyte count.	Granulocyte count.	Lymphocytes + monocytes.	Differential count.								
					Monocytes.	Lymphocytes.	Plasma cells.	Myelocytes + meta.	Staff-nuclears.	Segmentation-nuclears.	Eosinophils.	Basophils.	Granulocytes. Total.
					Per cent.								
1st	8.45	9020	5680	3340	4⅝	32	½	0	6½	53½	3½	0	63
	8.55	Amidopyrin 0·20 g.											
	9.30	6018	3970	2048	3½	30⅝	0	0	8	57	1	0	66
	10.00	4040	3110	930	0	23	0	0	12½	63½	1½	0	77
	10.30	1920	1452	468	4½	19⅝	½	0	20⅝	54⅝	½	0	75⅝
	11.00	3620	3200	420	1½	9	0	1	29½	59	0	0	88½
	11.30	6018	5660	358	0	5⅝	½	3½	37½	53	½	0	94
	12.00	7700	7030	670	0	8⅝	0	3⅝	34½	53	½	0	91½
	12.30	6700											
	13.30	11,520	11,360	160	½	1	0	2⅝	41	54⅝	½	0	98⅝
	14.00	6360	6080	280	½	4	0	1½	31⅝	62⅝	0	0	95⅝
	14.30	7640											
	15.00	6400	6250	150	0	2½	0	1½	29	67½	0	0	97½
	15.45	5200											
	16.10	4260	3990	270	½	6	0	⅝	26⅝	66½	0	0	93⅛
	16.30	3140											
	17.00	4180											
	17.30	5080											
	18.00	4320											
	18.30	5600	5150	450	1½	6⅝	0	1	27½	63⅜	0	0	92
	19.45	4800	4420	380	1	6⅝	½	½	29	62⅝	0	0	92
	20.30	3920											
	22.00	4300	3850	450	1½	9	0	1	27½	61	0	½	89⅝
2nd	6.10	3100	1975	1125	3⅜	32½	½	½	18½	44⅛	½	0	63⅝
	7.10	2240											
	8.10	2980	1610	1370	6½	39⅜	0	0	17½	36⅝	0	0	54
	9.00	1990	1134	856	5⅜	34⅛	0	0	22	37½	½	0	59⅝
	10.00	2440											
	11.00	2020	1218	802	4½	35½	0	1	29⅜	29⅜	0	0	60½
	12.00	2018											
	13.00	2240	1456	784	3½	32⅜	0	1	22	40⅜	½	0	65
	14.00	3200	1856	1344	3	39	0	½	24½	33½	0	0	58
	16.30	3600	1956	1644	2½	43½	0	0	27	27½	0	0	54½
	17.30	3020	1681	1339	4	40½	0	½	25½	30	0	0	55½
	19.30	3160	1854	1306	8½	33½	0	0	25⅜	32	⅛	0	58⅜
	21.00	3760	2144	1616	6	37	0	0	25	31⅛	½	0	57
3rd	9.30	4720	2126	2594	6⅜	48½	0	0	15½	29	½	0	45
	13.00	3800											
	17.30	3480	1160	2320	6	60	⅜	½	8½	23	1⅜	0	33½
	21.00	3680	1338	2342	7	56⅜	0	0	11⅜	23⅜	⅜	½	36½
4th	9.30	5480	2248	3232	6	51	0	0	9⅜	30⅜	2⅛	½	41
	13.30	5120	1793	3327	7	57⅜	⅛	0	6	27	2	0	35
	18.30	4440	1303	3137	4	66⅜	⅛	0	5⅛	22½	⅜	½	29½
5th	11.00	4720	1086	3634	9½	67	⅛	0	7	17⅜	2⅛	0	23
6th	—	6440	2534	3906	8½	52	½	0	6½	25	8	0	39½
7th	—	7260	2470	4790	8½	57⅜	0	0	6	23½	4½	½	34
8th	—	8600	2438	6162	9½	62	½	0	6⅜	19½	2½	0	28½
9th	—	7680	1920	5760	9⅜	65	½	0	4	17	4	0	25
10th	—	10,420	2740	7680	9½	64	½	0	6	18⅜	1⅜	0	26½
11th	—	5880	2350	3530	7⅜	51⅛	0	0	8⅜	29	3	0	40⅜
12th	—	9560	4300	5260	9½	45⅜	0	0	4½	37⅞	3	0	45
14th	—	9790	4993	4797	6½	42⅜	0	0	11½	39½	0	0	51
15th	—	9320	6058	3262	3⅜	31½	0	0	9½	55⅜	0	0	65
16th	—	8800	5192	3608	7½	33⅜	½	0	7½	50	1½	0	58⅜
17th	—	8920	4400	4520	4⅜	45⅜	½	0	8½	40⅜	½	0	49½
18th	—	7990	4095	3895	3½	44½	½	0	7½	42½	1½	0	51½

pouring into the blood stream of immature granulocytes, probably as a reaction of the organism to the drug. This transitory shift to the left of the blood picture and rise in granulocytes (as observed by very frequent counts in the first hours after the drug was taken) are not described by Madison and Squier, or by Zinberg, Katzenstein, and Wice, and they are not mentioned in the various case reports. Nor was any such mention to be expected, since cases of agranulocytosis are seldom observed until some time after the drug is taken—that is, when there is already an obvious granulocytopenia.

(3) The effect on the *non-granular white blood-cells* differed from the effect on the granulocytes in three respects. (*a*) The immediate fall during the first hours after the administration of amidopyrin was considerably greater than the fall in the granulocyte count—namely, from 3350 to 150, or to about 1/22 of the initial value—whereas the granulocyte count fell to about ¼ and, 24 hours later, to about 1/5 of the initial value. At the time when the mononuclear cells reached their minimum, and 2½ hours after the granulocytes reached their maximum, the patient had chills, and his temperature was highest. (*b*) The rise in the granulocyte count after the primary fall was not accompanied by any increase in the number of non-granular cells but, on the contrary, by a continued fall. (*c*) The granulocyte count kept rather steadily at a low level for eleven days and did not begin to rise definitely before the twelfth day, whereas the mononuclear cell count showed a distinct rise as early as 24 hours after the drug was taken. This rise of the mononuclears continued quite gradually until the maximum was reached on the tenth day with a count of 7700, more than twice the initial value. At this time the mononuclears amounted to 74 per cent. of the total white cell count, and the blood smear looked quite like the blood picture seen in infectious mononucleosis—that is to say, there was considerable preponderance of large irregular, partly monocyte-like lymphocytes. So until the granulocyte count began to increase on the twelfth day, the rise of the total white cell count was due entirely to the increasing number of mononuclear cells.

(4) The *monocytes* behaved like the mononuclear cells in general.

(5) The *eosinophil cells* disappeared almost completely and did not reappear until the third day, and increased in number to 8 per cent. on the sixth day, after which the eosinophil count again fell off a little.

WHICH PERSONS ARE HYPERSENSITIVE TO AMIDOPYRIN?

There is an important practical question that suggests itself at once: Is it possible to recognise the people that amidopyrin will harm? As shown in Fig. 3, a majority of the women patients whose age is stated belong to the age-group 40–49, whereas the greatest number of males is found in the 60–69 group. As is mentioned by Bie,[25] it has been suggested that functional disturbances of the endocrine glands may play a part in the development of the disease, and the age-difference in the apices of the curves for female and male may possibly be due to some such factor. Recently Jackson and Merrill [26] have reported a case in which the hormonal conditions seemed to have a dominating rôle. The patient, a woman, was examined over a period of ten months and pronounced granulocytopenia was found corresponding to the first day of each menstrual period. Thompson [27] has described the case of a man, 25 years old, suffering from diabetes insipidus, who since the age of 2½ months had had regular attacks (at three weeks' interval) of stomatitis, fever, and granulocytopenia. These attacks could be prevented or cured by administration of nucleotide K 96. In this patient the excretion of folliculin (œstrin) and of gonadotropic hormones during the attacks differed essentially from the excretion in the intervening periods. In the case of a female patient reported by Siggaard Andersen [9] there was a rise of the granulocyte count after administration of thyroid extract.

Though the age-distribution and the investigations above mentioned suggest that persons of certain types are particularly apt to have agranulocytosis, it is not practicable to protect such persons by taking care not to prescribe amidopyrin for them. Agranulocytosis may occur at any adult age. It is highly

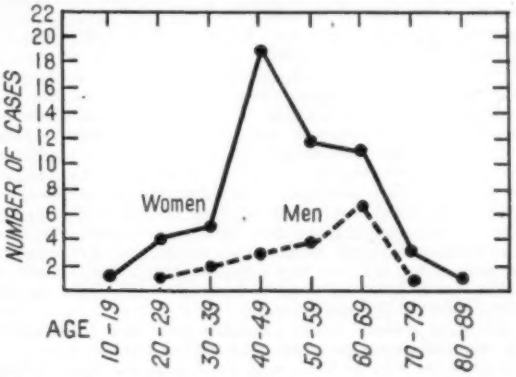

FIG. 3.—Age- and sex-distribution of 74 reported cases of agranulocytosis, attributed to amidopyrin, in which the patient's age is stated.

improbable, moreover, that the intolerance can be established satisfactorily by examining the blood after a single dose; for at present we do not know whether an allergic condition may not develop later, or whether certain individuals are permanently hypersensitive or are merely hypersensitive at certain periods according to unknown conditions such as hormonal imbalance or absorption of toxins. On the contrary, it is an established fact that patients may suddenly have agranulocytosis after amidopyrin even though they have used this drug previously without any subjective discomfort.

As amidopyrin agranulocytosis is presumably due to hypersensitiveness, one might perhaps expect that these presumably hypersensitive persons would give a positive cutaneous reaction to amidopyrin. This question has been investigated in a few cases by Randall, by Corelli, and by myself, but the tests proved consistently negative. One thing which makes it seem improbable than any information about hypersensitiveness to amidopyrin will be obtained by cutaneous tests is the fact that an amidopyrin rash may appear without any changes in the blood picture (Preben Hansen [28]). After the rash had disappeared in the case described by Hansen it could be produced again by administration of 0·05 g. of the drug; yet there was no change in the white blood count.

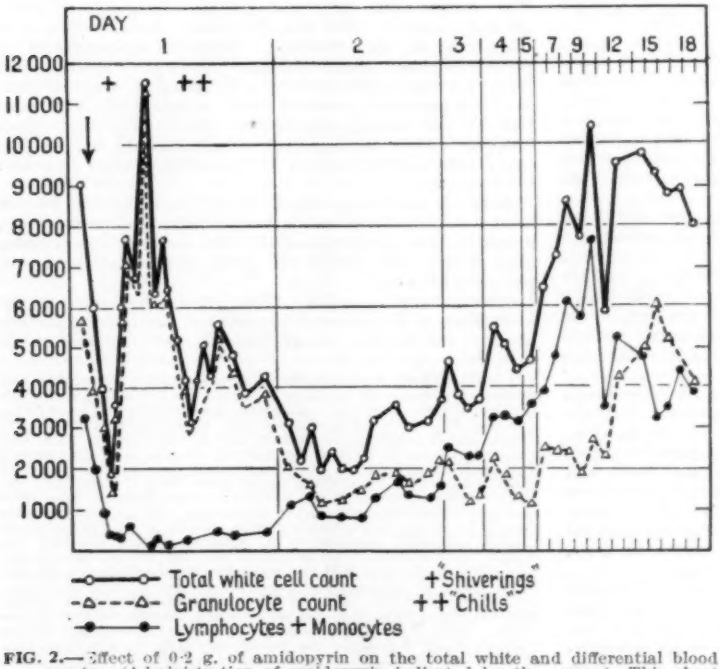

FIG. 2.—Effect of 0·2 g. of amidopyrin on the total white and differential blood counts. (Administration of amidopyrin indicated by the arrow.) This chart summarises the main findings set out in Table II.

SEVEN CASE RECORDS

The following is a brief account of the seven cases of agranulocytosis admitted to the Blegdamshospital between March and July, 1934. All the patients had taken amidopyrin-containing preparations in the period immediately before the appearance of agranulocytosis.

CASE 1

Woman, single, aged 49. Admitted on March 27th, 1934; died on the 30th.

Diagnosis: agranulocytosis; chronic myocarditis. Anamnesis: in childhood, anæmia; 1930, nervous trouble; 1931, pneumonia and meningitis. In recent years some epigastric oppression and functional dyspnœa. Menses: always regular; present on admission (first day).

Amidopyrin.—In giving her history the patient explicitly stated that she had taken no amidopyrin-containing preparation in the last few month. The family practitioner and a specialist both said that intake of amidopyrin could be excluded. Only on further inquiry was it found that Prokliman had been prescribed for the patient on Jan. 30th, 1934. (Prokliman contains among other things 0·10 g. of amidopyrin per tablet.) The dose given was one tablet three times daily, and this prescription was repeated on Feb. 10th and 28th. Thus, presumably, the patient had taken about a hundred tablets containing a total of 10 g. of amidopyrin. It was further stated that two years previously she was probably given an amidopyrin-containing preparation for some time without any demonstrable injurious effect.

On March 26th the patient became ill with sore-throat, and she felt chilly and feverish.

Physical signs.—When she was admitted to hospital on the following day she was rather exhausted. The temperature was 39·5° C., and the pulse-rate 124. There was no dyspnœa, but slight jaundice. The tongue was moist. Fauces: red; no particular swelling; no pseudomembranous exudate. The right angular lymph gland was enlarged and tender (size of hazel-nut); otherwise no swelling of lymph glands. Heart and lungs: slight widening of the heart borders; heart sounds distant; systolic sound somewhat elongated over the apex; accentuation of the second pulmonary sound; lung findings normal. Abdomen: liver and spleen not palpable. No purpura.

Blood examination.—On March 29th. Total white cell count 600; granulocytes 0; lymphocytes and monocytes of normal appearance.

Course.—The patient grew rapidly worse, became restless and sleepless, had small patches of exudate in the throat, increasing difficulty of swallowing, and increasing dyspnœa. She was treated with Pentnucleotide and liver extract. She died three days after admission, on the fifth day of illness. No autopsy was allowed.

Epicrisis.—A woman, aged 49, acquires agranulocytosis, and dies on the fifth day of illness. During the previous two months she was treated with an amidopyrin-containing preparation, getting in that time about 10 g. of amidopyrin in all.

CASE 2

Woman, aged 40, married. Admitted on May 31st, 1934; died on June 6th. Diagnosis: agranulocytosis. Anamnesis: 1½ years before, operation for bile-duct disease; no symptoms since; four months ago, operation for uterine tumour. Menses irregular in the last 1½ years, making their last appearance ten days ago, when the present illness began.

Amidopyrin.—Since February of this year she had been under treatment for sciatic pain, getting altogether 115 Diallypyrine tablets, with a total content of about 23 g. of amidopyrin and 3·45 g. of diallylbarbituric acid. ("This was the only medicine that would agree with her.") During the week before the onset of her present illness she took four tablets daily; since the onset two tablets daily. On May 20th or 21st she was taken ill with sore-throat and fever (38·3° C.).

Physical signs.—On admission, ten days after the onset, she was rather exhausted. The temperature was 40·1° C., the pulse-rate 140. There was a slight dyspnœa. The cheeks were flushed, the skin otherwise of subicteric hue. The tongue was dry and coated. Fauces: redness and some swelling; patches of whitish exudate on both tonsils. The angular lymph glands were enlarged (hazel-nut and kernel size respectively). Otherwise no enlargement of lymph glands. Heart and lungs: normal findings. Liver and spleen not palpable. No purpura.

Blood examination.—On June 1st: red cells 4,060,000, red blood picture normal; total white cell count 820, granulocytes 0. June 2nd: total white cell count 400, granulocytes 0. June 3rd: total white count 300, granulocytes 0. June 4th: total white count 300, falling to 120, granulocytes 0.

Course.—The patient grew more and more ill, being now and then a little dizzy, restless, and sleepless. Because of increasing difficulty in swallowing she was almost incapable of taking any fluid. She became more and more dyspnœic and cyanotic. She had four blood transfusions—with a total of two litres—and was also treated with pentnucleotide, liver extract, and detoxin. She died on the seventeenth day of illness. During the second blood transfusion, samples of blood were taken from the ear at intervals of about five minutes, in order to see how rapidly the transfused leucocytes disappeared from the peripheral blood stream. It was found that the total number of white blood-cells decreased a little during the transfusion; only one of the blood samples showed a few granulocytes.‡

Autopsy.—The bone-marrow of the femur contained almost no granulocytes. The lungs, liver, and spleen showed also an almost complete absence of polymorphonuclears. Cultures from the heart's blood grew *Staphylococcus aureus* and a non-hæmolytic streptococcus. Cultures from the spleen grew the same organisms as were isolated from the heart's blood and also *Bacillus proteus.*

Epicrisis.—A woman, aged 40, acquires agranulocytosis after she has been treated for three months with a total of 23 g. of amidopyrin and 3·45 g. of diallylbarbituric acid. She dies on the seventeenth day of illness.

CASE 3

Woman, married, aged 64. Admitted to Dept. III. (Medicine) of the Kommunehospital on June 17th, 1934; died on June 20th. Diagnosis: agranulocytosis; cardiac degeneration; hypertension; aneurysm of the right common carotid artery. Anamnesis: 1924, nervous trouble; 1926, cholelithiasis, with a few subsequent attacks. Climacteric at the age of 54.

Amidopyrin.—Lately, presumably in the previous fortnight, the patient had been given altogether 15 Geamin tablets, with a total content of 2·55 g. of amidopyrin and 1·20 g. of amidopyrin diallylbarbiturate—for pain from ulcers of the leg, she said. On June 15th she became ill with headache, vomiting, and backache; the temperature was 38·2° C., rising to 40°.

Physical signs.—On admission, two days after the onset, she was exhausted and dyspnœic. The temperature was 40·5°, the pulse-rate 116, the respiration-rate 30. The tongue was dry and coated. Fauces: redness; no real exudate. The angular glands were swollen (size of hazel-nut) and tender; otherwise no swelling of peripheral lymph glands. Lungs: no definite abnormality. Heart: rough indefinable systolic murmur, most obvious over the pulmonary valve; heart sounds dull; accentuation of the second pulmonary sound. Blood pressure, 185/75. Electrocardiogram: preponderance of the left side; auricular fibrillation. Liver and spleen not palpable. No purpura.

Blood examination.—June 19th: hæmoglobin 90 per cent.; red blood picture normal; white cell count 3800, granulocytes 0, lymphocytes of normal appearance. June 20th: total white cell count 3500, granulocytes 0, platelets 120,000.

Course.—On June 19th there were extensive plaques of exudate in the fauces. The patient was quickly getting worse; she became more cyanotic and dyspnœic, with

‡ It is difficult to understand how so many leucocytes can be removed from the blood so rapidly. Post-mortem examination never reveals any accumulation of leucocytes in the organs; nor was any such accumulation seen at autopsy in this case. When the leucocytes of normal blood were mixed with the patient's blood in vitro there was no change in their number during 24 hours. It is therefore highly improbable that the transfused white blood-cells could have been "dissolved" in the circulating blood of the patient—an explanation that also seems improbable a priori. It is perhaps conceivable that the normal tendency of the leucocytes to wander along the capillary wall is increased abnormally in agranulocytosis, so that the leucocytes "stick," so to speak, to the wall of the capillaries. According to A. Krogh,[10] the total length of all the capillaries in an adult of average size amounts to about 100,000 km.—i.e., 100,000,000,000 mm. Setting the normal leucocyte count at 6000, five litres of blood will contain 30,000,000,000 leucocytes. Now, if only there be one leucocyte "sticking" to the wall at every 3 mm. in the entire capillary system (and this could hardly be demonstrated histologically), the whole blood stream would be "cleaned out" for leucocytes within a few minutes.

shallow and greatly accelerated respiration. She was given liver extract and pentnucleotide, besides injections of salt solution and stimulants. She died on the sixth day of illness. Autopsy not allowed.

Epicrisis.—A woman, aged 64, acquires agranulocytosis, and dies six days after the onset. She was treated in the preceding fortnight with a total of 2·55 g. of amidopyrin and 1·20 g. of amidopyrin diallylbarbiturate.

CASE 4

Man, aged 55. Admitted on June 20th, 1934; died on June 21st. Diagnosis: agranulocytosis. Past history of good health; six weeks previously fracture of ribs (ambulant treatment).

Amidopyrin.—During this period the patient was given Sedalyl for the pains from the fracture—altogether fifty-five tablets with a total content of 11 g. of amidopyrin and 2·75 g. of ethyl-allylbarbituric acid. On June 18th the patient was taken ill with a cold and difficulty of swallowing. The temperature was 39° C.

Physical examination.—On admission, two days after the onset, the patient was very poorly. The temperature was 39·5° C.; the pulse-rate 116, the respirations 25. The tongue was moist and coated. Both tonsils were half covered with patches of greyish exudate. The right angular lymph gland was swollen (a little over hazel-nut size) and very tender, with moderate infiltration of the surrounding structures. The left angular lymph gland was as large as a nut kernel, indolent. On the left cheek was a round spot of superficial necrosis, almost 2 cm. in diameter. There was jaundice of the skin and scleræ. Heart and lungs: normal findings. No purpura.

Blood examination on June 21st: red cells 4,450,000, hæmoglobin 90 per cent., colour-index 1·01, total white cell count 490, granulocytes 0. Red cells and platelets of normal appearance. Blood culture: no growth.

Course.—The patient grew rapidly worse, becoming very dyspnœic, restless, and sleepless. He was treated with pentnucleotide and liver extract, besides saline injections and stimulants, but died on the fourth day of illness. At *autopsy* the bone-marrow of the femur showed much degeneration and absence of granulocytes.

Epicrisis.—A man, aged 55, acquires agranulocytosis (and dies on the fourth day of illness) after six weeks' treatment with a total of 11 g. of amidopyrin and 2·75 g. of ethyl-allylbarbituric acid.

CASE 5

Woman, married, aged 71. Admitted on July 3rd, 1934; died next day. Diagnosis: agranulocytosis, pneumonia. Anamnesis: 1914 and 1921, operations for tumour of the tongue, three years ago the patient was in hospital for "heart and lung trouble," "lately" she had had several attacks of sore-throat. On June 5th there was an attack of gall-stone colic, lasting a fortnight.

Amidopyrin.—The patient's relatives and medical attendant (who was away on vacation during the greater part of her illness) stated positively that she had certainly not had any amidopyrin-containing preparations. Inspection of her medicine chest, however, revealed a glass labelled "diallylpyrine, 100 tablets," marked with her name and dated June 16th, 1934. Nineteen tablets were missing (with a total content of 3·80 g. of amidopyrin and 0·57 g. of diallylbarbituric acid), and these in all probability the patient had taken between June 16th and 29th on the prescription of another physician. On June 29th she felt indisposed, was dizzy and tired, and had chills. During the following day she became more and more debilitated, and then stuporous, with râling respiration.

Physical examination.—On admission, four days after the onset, she was moribund. The temperature was 40·3°, rising to 41°, the pulse-rate 120, the respiration 40. The tongue was dry and "varnished." Fauces: slight redness and swelling, no ulceration or phlegmon. Infiltration of the loose tissue on both sides of the neck; no palpable lymph glands. No jaundice and no purpura. Heart sounds distant, action regular. Lungs: pneumonia in the left lower lobe. Liver and spleen palpable.

Blood examination on July 3rd: total white cell count 900, granulocytes 0, red cells and lymphocytes of normal appearance.

Course.—The patient did not respond to stimulants, and died twelve hours after admission on the fifth day of illness. No autopsy was allowed.

Epicrisis.—A woman, aged 71, acquires agranulocytosis (and dies four days later) after two weeks' treatment with a total of 3·80 g. of amidopyrin and 0·57 g. of diallylbarbituric acid.

CASE 6

Man, aged 56. Admitted on July 4th, 1934; died on the 5th. Diagnosis: agranulocytosis. The history was defective because he was somewhat dizzy and confused. Relatives stated that he had suffered from "nervous trouble" for about two months before the onset of the present illness.

Amidopyrin.—During the last two months the patient was treated with three bottles of an iodide preparation and 3½ bottles of a mixture composed as follows: luminal sodium 0·30 g., amidopyrin 2 g., extract belladonnæ 0·20 g., infus. adonis vernalis 5·40 g. (one tablespoonful twice daily). He was said to have followed the prescription closely, and thus he had got a total of 7 g. of amidopyrin and 1·05 g. of luminal sodium. On June 28th he was taken ill rather suddenly with difficulty of swallowing and general malaise.

Physical examination.—On admission the patient was very exhausted, dyspnœic with loud respiration, somewhat confused. The temperature was 40·7°, the pulse 140, very soft. The tongue, mucous membrane of the mouth and fauces were dry. Both tonsils and both angles of the uvula were covered by a thin greyish-brown exudate. There was marked fœtor. No swelling of the angular glands. Lung findings normal. Heart, by lung, heart sounds distant. Liver and spleen are palpable. No purpura.

Blood examination on July 4th: total white cell count 920, granulocytes 0, red cells and lymphocytes of normal appearance.

Course.—The patient became moribund rapidly, and died fourteen hours after admission on the eighth day of illness. No autopsy allowed.

Epicrisis.—A man, aged 56, acquires agranulocytosis (and dies on the eighth day of illness) after eight weeks' treatment with a total of 7 g. of amidopyrin and 1·05 g. of luminal sodium.

CASE 7

Woman, single, aged 46. Admitted on July 11th, 1934; discharged on August 20th. Diagnosis: agranulocytosis. Anamnesis, curettage of the uterus for metrorrhagia about 20 and 14 years ago; during the last eighteen months the menses have been present only once (January, 1934). Otherwise past history of good health.

Amidopyrin.—Because of climacteric symptoms the patient was treated with Klimaxid from the autumn of 1933 to April, 1934. She took again klimaxid during the last fortnight—about thirty tablets in that period. Thus she had taken altogether about four hundred tablets, with a total content of 40·0 g. of amidopyrin and 10·0 g. of ethyl-allylbarbituric acid. On July 8th, three days before admission, she was taken ill with angina and fever.

Physical examination.—On admission the patient was not exhausted. The temperature was 38·8° C., the pulse 108, the respiration 36. The tongue was coated, not dry. The tonsils showed some ulceration and patches of whitish exudate. The angular lymph glands were slightly enlarged, tender. Heart: the first sound was prolonged over the apex, otherwise normal findings. Lung findings normal. Liver and spleen not palpable. No icterus or purpura.

Blood examination July 12th (noon): total white cell count 900, granulocytes 1 per cent., lymphocytes 99 per cent., red blood picture normal. July 13th (1 P.M.): total white cell count 870, granulocytes 26 per cent. July 14th: white cells 3240, granulocytes 56 per cent.

Course.—Under treatment with pentnucleotide, liver extract (parenterally), folliculin (parenterally), and blood transfusion, the patient became fever-free on the eighth day of treatment. The blood picture became normal at the same time, after a very pronounced shift to the left.

Experimental test.—In the middle of December she was given three doses of amidopyrin (0·20, 0·40, and 0·60 g.), distributed over two successive days, which were followed

each by a decided fall in the granulocyte count (maximum 50 per cent.). A detailed account of this test will be published later.

Epicrisis.—A woman, aged 46, has taken for about six months a climacteric preparation containing amidopyrin, and it gave her no subjective discomfort. Three months later she acquires agranulocytosis after taking the same preparation for a fortnight. During the two periods of medication she has taken altogether 40 g. of amidopyrin—including about 6 g. in the last two weeks.

COMMENTS

The experiment described above shows indisputably that even a very small dose of amidopyrin (roughly corresponding to the amidopyrin content of one Cibalgin tablet) may in a disposed person have a violent action on the white blood corpuscles—an action that is still pronounced as long as twelve days after the dose is taken. Although in this experiment the granulocytes never disappeared altogether, the hæmatological course of the case suggests decidedly that a typical agranulocytosis would have been produced by the cumulative effect of amidopyrin if this drug had been given repeatedly for a few days. If, for example, 0·20 g. had been given daily for twelve days, on the twelfth day all these doses would probably still be exerting their reducing effect upon the granulocytes; while the reducing effect upon the lymphocytes would be far less cumulative, since the influence of a single dose subsided in 24 hours and disappeared almost completely in 48.

The various experiments carried out on human beings to investigate the agranulocytosis-producing property of amidopyrin supplement each other nicely. All the authors have observed a distinct decrease in the granulocyte count, and Madison and Squier have even brought about a complete disappearance of granulocytes. Most of the investigators have observed a rise of temperature, and Benjamin and Biederman's patient had all the symptoms of agranulocytosis—including sore-throat and stomatitis. Only Corelli and myself have seen a secondary granulocyte increase between a primary fall and a secondary fall. From these experiments it may reasonably be taken as established that amidopyrin can give rise to agranulocytosis.

Since this effect of amidopyrin has been recognised it has become possible in a large majority of cases (in Denmark, all the cases) to ascertain that the patients were taking amidopyrin in the period immediately before the onset of the disease. This fact, together with the experimental findings indicate almost conclusively that amidopyrin in therapeutic doses is the cause of agranulocytosis in a majority of cases of this disease. Recently H. Jackson, Jr.,[21] has reported his findings in 27 cases of agranulocytosis examined with a special reference to the use of amidopyrin, and arrives at the result that only 7 of these patients had taken amidopyrin at a time when this might conceivably have been an ætiological factor. From Jackson's paper it is impossible to see whether his material consists of cases observed after the amidopyrin question had become topical, so that the data in the histories of the patients may be looked upon as ascertained with particular attention to this point, or whether they may have been cases of an older date, in which the data concerning home treatment, before admission to the hospital, are often somewhat defective with regard to the analgesics employed by the patient. At present, we know of no other chemical compounds closely related to amidopyrin that may produce the same effect (e.g., phenazone). Compared with the many cases of agranulocytosis developed after intake of amidopyrin, there are but few cases on record in which this disease in its "pure" form developed after use of other drugs. Combined hæmotoxicoses, including leucopenia, thrombopenia, and anæmia have been described a number of times after administration of salvarsan and gold preparations (D. L. Farley,[30] Bock and Wiede,[31] F. P. McCarthy and R. Wilson,[32] S. Emanuel,[33] J. Braillon [34]); a few such cases have been described after benzol (Barker,[35] Flandin and Roberti,[36] Rohmer, Baldridge, and Hansman [37]). Pure cases of agranulocytosis after salvarsan have been reported by B. Appel,[38] J. M. Foster,[39] Pouzin Malegue,[40] and by Landsberg,[41] (one case each), after bismuth by Aubertin, Blankstein, and Lehman [42] (one case), after salvarsan and bismuth by E. Steinert [43] (one case), after salvarsan and mercury by C. P. Wilson [44] (one case), after gold by J. Braillon [45] (one case), and after dinitrophenol by Hoffman, Butt, and Hickey,[12] S. S. Bohn,[46] Davidson and Shapiro,[47] and by S. Silver [48] (one case each). In view of the extensive employment of amidopyrin it is reasonable to conclude that very few persons are hypersensitive to it and in this it resembles Atophan, Neosalvarsan, and Sanocrysin. Yet I have no doubt it will turn out that deaths due to amidopyrin are considerably commoner than those due to any other drugs (apart from overdosage and suicide).

SUMMARY AND CONCLUSIONS

1. It is demonstrated that in a disposed person even a single small dose of amidopyrin may have a very strong and protracted reducing effect upon the white blood cell count, including mononuclears as well as polymorphonuclears.

2. While agranulocytosis is caused occasionally by other medicaments (benzol, salvarsan, gold, bismuth, and dinitrophenol), there can be no doubt that in the great majority of observed cases it is produced by amidopyrin.

3. In 74 reported cases in which the age and sex are stated the incidence of agranulocytosis following administration of amidopyrin is as follows: 56 women (75 per cent.) and 18 men (25 per cent.); among the women the greatest frequency of the disease is found in the age-group of 40–49 years, and among men in the age-class of 60–69 years.

4. Seven cases of agranulocytosis arising after therapeutic doses of amidopyrin (six of them fatal) are described. These seven comprise all the cases of agranulocytosis admitted to the Blegdamshospital since March, 1934, when our attention was called to the importance of amidopyrin as a factor in the causation of this disease.

ADDENDUM: Since the ætiological significance of amidopyrin has become a subject of general discussion in Denmark (August, 1934), no new case of agranulocytosis has been admitted to the Blegdamshospital (Dec. 15th, 1934). During the same five months in 1933 a total of 5 patients were admitted with agranulocytosis.

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"DIGESTIBILITY" OF COMMON FOODSTUFFS AS DETERMINED BY RADIOGRAPHY

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HON. PHYSICIANS TO THE WOKING VICTORIA HOSPITAL

The study of the digestion-time of various foods in the human stomach was begun by Beaumont [1] in 1847. His observations were carried out on the hunter Alexis St. Martin, who had a permanent gastric fistula. The quantity of food given in these experiments was not generally measured. Jessen [2] in 1883 and Reichmann [3] in 1885 followed with experiments using the large stomach-tube. Penzoldt [4] and Verhaegen [5] in 1893 and 1898 made important contributions, measured quantities of foods being given and samples of stomach contents being drawn off at frequent intervals by means of the stomach-tube. In 1918 to 1920 Rehfuss, Hawk, and numerous collaborators,[6] in America, published a series of papers on the "gastric response" to various foods. They carried out a most extensive series of experiments on medical students, using the Rehfuss tube. This was a small tube that could be left in the stomach during the experiment, and was found to offer no difficulty to the chewing or swallowing of food. Samples were drawn off at frequent intervals, usually 15 minutes, until the stomach was empty. Some idea of the extent of this brilliant series of investigations may be gathered from the fact that they included no less than 90 experiments with eggs (raw, cooked, or in mixtures), 70 with beef, 50 with pork and lamb, and 120 with vegetables. In the egg series they even included the Chinese preserved egg known as pidan, though as they remark they found it to "possess distinct odours of ammonia and hydrogen sulphide." It must not be forgotten, however, that their method necessitated the withdrawal of 5–8 c.cm. of stomach contents every 15 minutes, and in the course of a long experiment there must have been quite a considerable reduction in the amount of the meal, consequently affecting the emptying time. It seems to us also that the presence of a tube in the stomach was likely to cause exaggerated peristalsis.

Representative average results of the Rehfuss-Hawk experiments were:—

	Hours
Beef, roast or stewed	2½–3½
Eggs, soft boiled	2 –2¾
,, hard boiled	2¾–3½
Potato, boiled, mashed, or baked	1½–2¼
,, fried or as chips	2 –2¾
Carrots, beet, tomatoes, cabbage, lettuce, cucumbers, string beans, peas, turnips	1 -2

In each case 100 g. of the food was given. Cooking lessened the emptying time for some foods and increased it for others—e.g., boiled carrots took distinctly longer than raw, while raw eggs took longer than either soft or hard boiled ones. The various forms of beef all took much the same time; roast (rare or well done), steak, boiled, corned or dried. Fat meat such as pork took longer than beef, and they noticed a "separation in the stomach of the different parts of the meat, the finely divided portions leaving first, then the coarse fibrous tissue, and lastly the fatty material." They made a great point of the variation in the stomach emptying-times of different individuals, and classify their subjects into two groups, rapid emptying and slow emptying types. They remark: "Nothing but confusion can result from a disregard of the marked differences in the stomach responses of different entirely normal individuals to the same stimuli."

Cannon [7] at Harvard in 1911 fed cats on boiled meat, fish, pork fat, starch paste, boiled potatoes, &c., mixing the food into a thick mush with bismuth. The stomach emptying-times for these foods were determined by X ray screening. He found that carbohydrates left the stomach in the shortest time, proteins took longer, fats longer still, and mixtures of protein and fat longest of all. His critics argued that the heavy bismuth remained in the stomach after the food had passed on, but examination of animals killed at various intervals after the meals showed that the bismuth remained well mixed with the chyme. No heavy deposits of bismuth were found on the mucosa, and food and bismuth remained well mixed in the gut.

We have been unable to find any reference to an X ray study of the emptying-time of the stomach for various foods in a series of healthy men and women, so have attempted to make these important observations ourselves. Such observations are not difficult, but take a good deal of time, patience, and some personal discomfort. In the past two years, when time permitted in a busy general practice, we have carried out the following series of experiments. It is a beginning which we hope to elaborate in the near future. The individuals who have been the

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DR. PLUM: *References*

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subjects of our experiments comprise three doctors, their wives, a dentist, and a medical student. Their ages vary between 18 and 45, they are all healthy, with excellent digestions, and during the experiments their daily work and duties were carried on as usual.

METHOD OF INVESTIGATION

Test-meals were generally taken in the morning when the stomach could safely be assumed to be empty. The barium was either mixed with the food or was taken with a little water during the eating of solid food. The amount of barium administered was generally one ounce. The stomach was screened at frequent intervals, films being taken in the earlier experiments to check the observations. The emptying-time was found to be determined easily, and one ounce of barium quite sufficient for good vision. Incidentally we have tried various quantities of barium from ½ to 2 oz. to see if the amount of the heavy salt affected the evacuation time, but no difference was noted. In none of our subjects was the greater curvature of the stomach ever seen to be more than one inch below the iliac crest line. All except one were smokers, and the effect of not smoking for a day or two before was carefully observed but no difference was detected. This point, however, has not been sufficiently investigated. On one occasion one of us had a severe headache, and his stomach took half as long again as the others that morning to empty. This experiment was discounted. Lately we have had the opportunity of watching the emptying-time for milk in a female whose stomach was of the atonic type, with the lesser curvature below the iliac crest line. Her emptying-time was very long indeed, and it is probable that normal stomachs of this type correspond to Rehfuss and Hawk's slow-emptying group.

RESULTS

The results of our experiments with single principal foods are shown in Table I.

TABLE I

Food taken.	Amount.	Subjects.	Emptying-time for each in hours.	Average in hours.
1. Water	1 pint	2	¾..¾	¾
2. Cane sugar.. ..	2 oz.	2	1½..1½	1½
3. Rich milk, raw ..	½ pint	2	3½..3½	3½
4. ,, ,, ,, ..	1 ,,	2	6½..6½	6½
5. ,, ,, boiled ..	½ ,,	1	2½	2½
6. ,, ,, ,, ..	1 ,,	2	5..5	5
7. Banana, raw ..	4 oz.	4	4½..4..4..4½	4½
8. Gooseberries, stewed	6 ,,	1	3½	3½
9. Bread, white ..	4 ,,	4	4..3½..3½..3½	3½
10. Potato, boiled ..	5 ,,	1	4	4
11. Cream, thin ..	3 ,,	2	3½..3½	3½
12. Butter, emulsified..	4 ,,	3	6½..6½..5½	6
13. Eggs, raw	2 eggs	1	3½	3½
14. ,, hard boiled..	2 ,,	1	4½	4½
15. ,, lightly boiled	2 ,,	1	2½	2½
16. ,, and milk, raw	2 ,,	3	4½..4½..4½	4½
17. ,, ,, cooked	2 ,,	3	3½..3½..3½	3½
18. Beef, boiled ..	4 oz.	4	4..3½..4½..3½	4
19. Vegetable salad ..	4 ,,	3	2½..2½..2½	2½

The emptying-time is given for simplicity to the nearest quarter of an hour, and it will be seen that the times for different subjects with the same meal are almost identical. Emulsified butter is butter that has been put through a cream machine with an equal amount of milk. The egg-and-milk mixtures were made with ½ pint of milk. Lightly boiled eggs were boiled for one minute, and hard boiled eggs for eight minutes. The vegetable salad consisted of lettuce, radishes, tomato, and cucumber.

Our figures indicate in general a distinctly longer emptying-rate than the tables of "digestibility" based on tube experiments. With regard to eggs, for example, we are in complete agreement as to the relative "digestibility" of the various forms, as usually given; but in each case our experiments indicate a longer period of stomach digestion. In Table II. our results are compared with those obtained with the tube by Penzoldt [4] and by Hawk, Rehfuss et al.[9]

TABLE II

Food.	Penzoldt.	Hawk and Rehfuss.	X ray.
	Hours.	Hours.	Hours.
2 eggs, raw	2¼	2..3	3½
2 ,, lightly boiled ..	1¾	2..2¾	2½
2 ,, hard ,, ..	3	2¾..3½	4½

The obvious criticism is that the barium holds up stomach emptying, or is left as a coating to the lower part of the greater curvature after the food has passed through the pylorus. But we find that a pint of water leaves the stomach in less than one hour, which is in entire agreement with the accepted data as given by Moritz,[8] so that any error on this score is of slight importance. We also used a small quantity of water to suspend the barium when testing dry food; but Hawk, Rehfuss, and their colleagues [10] have shown that the evacuation of the stomach is not noticeably delayed by the addition of water to a meal, in quantities up to a litre. Fleischer [11] found that a litre produced only slight slowing, and that it required about 1½ litres (about 3 pints) to produce any marked effect. A more likely explanation of the difference in our results is that the passage or presence of a tube in the stomach acts as an irritant and causes exaggerated peristalsis.

TABLE III.—*Mixed Meals of Various Kinds*

Cream, eggs, and toast— Thick cream, 5 oz. 2 eggs scrambled with the cream. Toast, 5 oz. ½ pint coffee with milk and sugar.	Taken 8.45–9.15 A.M. Stomach not empty till 3 P.M. *Time:* 6 hours.
Butter, eggs, and toast— Butter, 3 oz. 2 eggs scrambled with the butter. Toast, 5 oz. ½ pint coffee with milk and sugar.	Taken 1.50–2.10 P.M. Stomach contains some ounces at 7.15 P.M. *Time:* at least 6 hours.
Large cold supper— Cold pheasant. Mashed potato and chutney. A second helping of above. Sago pudding and jelly. Small bottle of beer. Coffee.	Taken 7.45–8.15 P.M. Stomach contains only an ounce or so at 12 midnight. *Time:* about 4½ hours.
An ordinary breakfast— Porridge, 5 oz. Sugar and milk. Fried egg. 2 rashers. 3 oz. toast. ½ pint coffee with milk and sugar.	Taken 8.50–9.10 A.M. Stomach empty at 1 P.M. *Time:* under 4 hours.

Our most striking and unexpected results were those with milk. A pint of milk of good quality takes no less than 6½ hours to leave the stomach. Boiled milk takes an hour less. Three ounces of thin cream—quite a small amount—take 3½ hours, and four ounces of emulsified butter take 6 hours. Milk fat, whether as milk, cream, or butter, is dealt with very slowly by the stomach. The length of stomach digestion of a food cannot therefore be taken as a direct measure of its "digestibility"; on such grounds milk would be much more indigestible

than beef, eggs hard boiled, or vegetable salad. Mixed meals of various kinds and the ordinary succession of meals throughout the day were investigated in the same fashion, with the results set out in Tables III. and IV.

The comparison of these four meals in Table III. is very instructive. The stomach emptying-time does not appear to us to depend so much on the quantity of food taken as on the amount of fat that is included. Of course no ordinary meal contains 5 oz. of thick cream or 3 oz. of butter.

TABLE IV.—*Ordinary Diet throughout the Day*

Breakfast— ½ slice toast. 2 pats butter. Marmalade. Tea with milk.	Taken 8.50–9.10 A.M. Stomach empty at 1.10 P.M. *Time:* under 4 hours.
Lunch— Rabbits in casserole. Potatoes and greens. Biscuits and butter. Cream cheese. Water.	Taken 1.30–2 P.M. Stomach not nearly empty at 4.30 P.M.
Tea— 2 cups tea. Hot scone and butter. Bread and butter. Sponge cake.	Taken 4.35–5 P.M. Stomach empty at 7.15 P.M. *Time:* 2¼ hours.
Dinner— Sherry. Fatty soup. Chicken. Fried potatoes. Toast and butter. Coffee.	Taken 7.30–8 P.M. Stomach full at 10 P.M.
Supper— Cup of tea. Small piece shortbread.	Taken about 10 P.M. Stomach empty at 11.40 P.M. *Time:* 4 hours.

These experiments were not carefully controlled in that measured quantities of food were not taken.

From these experiments it is clear that an ordinary meal leaves the stomach in 3½ to 4½ hours. However, we should like to have had the opportunity of ascertaining the emptying-time of the stomach for a City dinner; but it might offend the master and wardens if portions of barium were added to the succession of priceless wines that one is expected to imbibe on these occasions.

It is difficult to imagine why tea should be such a popular meal. With breakfast at 8.30 A.M. the stomach is likely to be empty at 12.30 P.M., so that lunch at 1 P.M. is reasonable enough. But after lunch at 1.30 to 2 P.M., the stomach cannot possibly be empty till 5.30 to 6 P.M., so that tea at 4.30 can only be justified on the grounds of a pleasing interlude. Actually on the grounds of suitable feeding, it would be better to leave out tea and take dinner at 6 or 6.30 P.M. The stomach would then have a little rest before both lunch and dinner, and would be ready to deal with the evening meal, which in the ordinary way would be disposed of by 10.30 to 11 P.M.

The relation of hunger to stomach content was always puzzling. We noticed that when the meal of potato 4 oz. (Table I.) was taken in the evening in place of dinner, we became ravenously hungry about 10 o'clock, at least one or two hours before the stomach was empty. Similarly with the meal of cream and eggs (Table III.) instead of the usual breakfast, when the experiment dragged on into the afternoon, the sensation of hunger was very definite, though the stomach was still far from empty. Hunger, as we have found it in our experiments, does not necessarily result from an empty stomach. The sensations of hunger are generally supposed to be due to vigorous peristaltic contractions of the stomach, but our observations gave no support to this view. Actually at the end of an experiment, when the stomach contained only a residual ounce or two, there was little evidence of peristalsis at all, though there was very definite hunger. The food residuum appeared to lie inert in the pyloric antrum, and only occasionally was a trickle seen to enter the duodenum.

CONCLUSIONS

1. An ordinary meal leaves the stomach in about four hours. A very large meal may be retained for five hours. 2. A meal, not necessarily large, but containing much butter or cream, is retained in the stomach for a longer period. 3. Concentrated carbohydrates such as sugar leave the stomach much more quickly than natural carbohydrates such as banana or potato. 4. Cooking shortens the time of stomach digestion of some foods and increases it for others. 5. The length of stomach digestion of different foods cannot be taken as a measure of their "digestibility." 6. Fat in abnormal proportions causes the stomach emptying-time to be prolonged to a very marked degree. 7. The sensation of hunger does not appear to be dependent on vigorous peristalsis.

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Clinical and Laboratory Notes

TWO CASES OF PHENYLPYRUVIC AMENTIA

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A METABOLIC abnormality, peculiar to aments, has recently been described by A. Föllings.[1] Ten cases of imbeciles were recorded in Sweden who excreted phenylpyruvic acid in the urine: there were four males and six females. In certain instances the abnormality was present in more than one member of a sibship but it was never found to occur in normal relatives. Phenylpyruvic acid is easily detected in acid urine by the addition of a few drops of a 5 per cent. solution of ferric chloride: a dark green colour appears which fades away in the course of some minutes. In alkaline urine it is necessary to acidify slightly, preferably with dilute sulphuric acid, before adding the ferric chloride. An alternative method is to extract the acidified urine with a small quantity of ether and then to pour some of the ethereal extract on to the surface of a ferric chloride solution. A dark green ring is observed at the junction of the two liquids.

Among 500 patients at the Royal Eastern Counties' Institution whose urines were tested, one case was found which gave the characteristic reaction: this patient is a male idiot aged 19. A brother of this patient, though not in the institution, is also an idiot and his urine gives the same reaction. The

[1] Zeitsch. f. Physiol. Chem., 1934, ccxxvii., 169.

urines of both parents and of two normal sibs were tested with negative results. The home lies in an isolated rural district. The parents are not consanguineous.

DETAILS OF THE FAMILY

Patients' father.—A coachman, aged 63, physically healthy, urine normal. He has recently been suffering from the delusion that people are poisoning him. His father had similar delusions for many years before his death at the age of 84; his mother was healthy and died aged 72.

Patients' mother.—A hard-working woman of the labouring class, aged 53, physically healthy, urine normal. A brother of hers has five healthy children, three of whom were rather dull at school; a sister of hers has two normal children. Her father (maternal grandfather of the patients) suffered from anæmia and had an enlarged liver; he died aged 52. The maternal grandmother was very healthy and lived to be 72.

Patients' sibship.—(1) Female, died at 10 months in convulsions.—(2) Male, aged 33, workman, very healthy and mentally normal.—(3) Female, aged 31, normal, is married and has a male child, aged 5, also healthy.—(4) Miscarriage at about the tenth week of pregnancy.—(5) Male, aged 24, won a scholarship to the secondary school—was fourth in the whole county; healthy.—(6) Male, aged 22, healthy and intelligent.

(7) Male, aged 19, idiot, urine contains phenylpyruvic acid. Blood Wassermann reaction negative. The birth was normal at full term and the child was, at an early age, recognised to be mentally defective. He had no convulsions. He has never walked or talked; he cannot feed himself and he is wet and dirty in habits; he sits or lies with his limbs contracted while he occupies himself with mannerisms of the fingers and with rocking movements of the trunk. He appears to notice a bright moving object. His head is small and brachycephalic (head measurements: length 17·1 cm.; breadth 14·3 cm.; cephalic index 0·84). There is a pigmented patch of skin on the right side of the forehead. The shoulders are broad but there is a marked kyphosis with depressed sternum; the teeth are widely spaced and the molars are decayed. He has long tapering fingers, thin legs, flat feet with partial syndactyly of the second and third toes. The testes are undescended bilaterally and the penis is small. Deep reflexes in the limbs are all very brisk; there is bilateral extensor plantar response. The abdominal reflexes are present. The forearms and legs show pronounced muscular wasting. The pupils react irregularly to light, there are signs of old iritis with adhesions especially in the right eye, bilateral cataract, and small corneal opacities. He once had an epileptic fit, when aged 14.

(8) Male, aged 16, urine normal, works in a foundry, intelligent and good at games, but scholastically backward on account of visual refractive errors. At the age of 15 years 2 months his score on the Stanford-Binet tests was only 9 years 8 months.—(9) Female, aged 13, urine normal, healthy, mentality normal. At the age of 12 years 6 months her Stanford-Binet mental age was 11 years 3 months.

(10) Male, aged 5, idiot, urine contains phenylpyruvic acid; unable to walk, talk, or stand, he can now crawl a little but hardly uses his legs at all and sits tailorwise; wet and dirty in habits; brachycephalic (head measurements at the age of 2 years 1 month: length 6·2 cm.; breadth 5·4 cm.; cephalic index 0·87). He suffers from constipation. The deep reflexes in the legs are very brisk; plantar responses extensor. Fits started when he was a few months old; they consisted of twitchings associated with apparent loss of consciousness. They have continued ever since and often occur several times in one day.

COMMENTARY

The two cases described here are more severely affected mentally than those which were described by Föllings. The epileptic fits in the second case are a novel feature but the kyphosis with broad shoulders, found in the first case, is supposed to be characteristic. Spasticity and skin pigmentation were found in several of the Swedish cases and signs of mental disease were noticed in relatives of some.

The discovery of this new special type of amentia raises some interesting and important problems. It seems likely that the cause of mental deficiency in these cases is an inborn metabolic error connected with the oxidation in the body of phenylalanine. The condition is, in some ways, analogous to alkaptonuria [2] and both the diseases are probably inherited as single Mendelian recessive characters.[3] The special association between abnormal metabolism and mental deficiency, however, which is characteristic of phenylpyruvic amentia, requires much investigation.

I am indebted to Sir F. Gowland Hopkins for providing me with a specimen of pure phenylpyruvic acid for control purposes. The investigation was carried out under the auspices of the Medical Research Council and the Darwin Trust.

DUODENO-RENAL FISTULA

By R. J. V. Pulvertaft, M.D. Camb., M.R.C.P. Lond.

DIRECTOR OF THE JOHN BURFORD CARLILL LABORATORIES, WESTMINSTER HOSPITAL; READER IN PATHOLOGY IN THE UNIVERSITY OF LONDON

(WITH ILLUSTRATION ON PLATE)

The close anatomical relationship between the duodenum, the right kidney, and the colon makes possible the development of fistulous communications between these organs. Duodeno-colic fistula has been found in relation to carcinoma of the hepatic flexure; but duodeno-renal fistula must be of extreme rarity. In the following case it was made possible owing to the coincidence of extreme scoliosis and renal calculus; the organs were therefore brought mechanically into abnormally close relationship.

The patient was an unmarried woman of 28, with a long history of tuberculous infection. At the age of 10 she underwent a series of operations for tuberculous abscesses in relation to the left hip-joint, and at the age of 12 superadded pyogenic infection necessitated amputation of the left leg at the hip-joint; this was performed by Mr. William Turner. She remained well for eight years, and then returned with a recent history of pain in relation to the amputation scar. She had then developed a very marked scoliosis with the convexity to the right. She was found to have an abscess in relation to the anterior superior iliac spine on the left side; several ounces of pus were evacuated, which showed only *Staphylococcus albus*; no tubercle bacilli were found. Examination of the urine at this time showed pus and organisms then identified as gonococci. There were no T.B. Ureteric catheterisation by Mr. G. T. Mullally showed the right kidney to be infected; coliform bacilli were found, but no T.B. The patient was virgo intacta; no cultural examinations of the organism were made; and it is highly probable that this infection was from the outset due to a coliform bacillus. The right kidney was normal.

She next reported eight years later; the scoliosis was now extreme. Her symptoms were pain in the right side of the abdomen of seven or eight weeks' duration, and of increasing severity. She suffered from nausea after food and general malaise; there were no urinary symptoms. The bowels were very loose, and she had lost much weight. The amputation site was quite healthy. The leucocyte count showed 14,600 cells, with 71 per cent. polymorphs. The urine showed much pus and albumin; the only organism found was *Staphylococcus albus*. The temperature varied between 99° and 103·2°. The X ray examination showed multiple calculi in the right kidney (Fig. I. on Plate). There was considerable tenderness on the right side, and an operation was performed on the right kidney by Mr. William Turner. An incision was made from a little below

[2] Dakin, H. D.: Oxidations and Reductions in the Animal Body, Monographs on Biochemistry, 1922, p. 84.
[3] Hogben, L., Worrall, R. L., and Zieve, I.: The Genetic Basis of Alkaptonuria, Proc. Roy. Soc. Edin., 1931–32, lii., 264.

the articulation of the twelfth rib with its vertebra towards the anterior superior spine. The kidney was opened along its posterior border, and a quantity of foul-smelling pus evacuated. There was also a large perirenal abscess. One large and many smaller calculi were removed, and four drainage-tubes were inserted, two draining the perirenal abscess and two the kidney. Immediately after the operation all fluid given by mouth was found to escape within a short time from the renal drainage-tubes. There were severe rigors; the patient died four days later.

Examination of the large calculus showed it to be irregularly shaped, with one large protuberance shaped like the terminal phalanx of the thumb. It was soft and crumbled readily, and consisted of calcium phosphate and calcium carbonate.

At the post-mortem examination an old fibrotic ulcer was found in the second part of the duodenum, communicating directly with the pelvis of the right kidney, to which the duodenum was closely adherent (Fig. II.). This ulcer was about three-quarters of an inch in diameter, and circular; its dimensions corresponded closely with the thumb-like protuberance on the phosphatic calculus. The extreme scoliosis had evidently forced the kidney into closer relationship with the duodenum, and calculus formation, which is probably related in this case to the renal infection, had by pressure produced a fistula between the duodenum and renal pelvis. The orifice had, however, been blocked by the calculus, whose removal established a fistulous track from the duodenum to the skin.

DUODENO-RENAL FISTULA

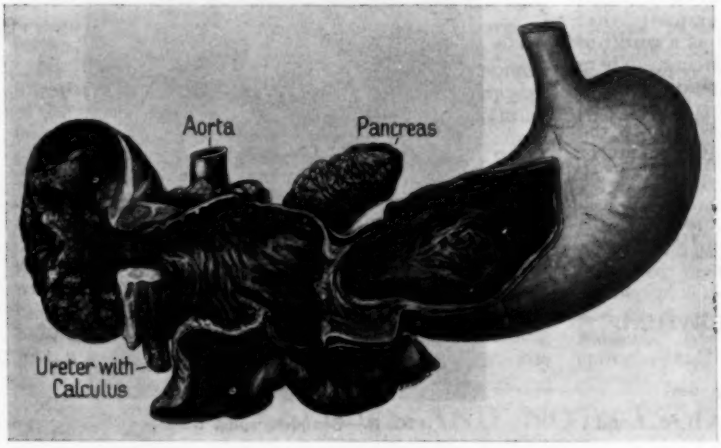

FIG. II.—Specimen showing the duodeno-renal fistula.

The histology of the affected tissues revealed no tuberculosis; the process indicated chronic and acute pyogenic infection.

My thanks are due to Mr. William Turner for permission to publish this case, and to Mr. S. A. Sewell for his drawing.

ACROMEGALY AND SPLANCHNOMEGALY

BY FF. ROBERTS, M.D. Camb., M.R.C.P. Lond.
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(WITH ILLUSTRATIONS ON PLATE)

IN August, 1927, an unmarried woman of 28 years, was referred to me by Dr. J. R. C. Canney for barium meal examination. She was 6 ft. 3 in. in height and typically acromegalic in appearance. For some years she had suffered from severe headache, but without any other symptom or sign of cerebral tumour. Some time previously she had had symptoms indicating left hydronephrosis. On exploration the left kidney was found to be enormously enlarged, but not structurally abnormal. Recently she had been complaining of vague abdominal pain.

Barium meal examination revealed no abnormality. The stomach was large but only in proportion to the size of the patient. In view of her headache I examined her skull with the remarkable result shown in Figs. I. and II. on Plate. It shows acromegalic hyperostosis and a large osteoma with a well-defined margin apparently growing from the falx cerebri. In the frontal and right temporal regions the skull has undergone a change closely resembling Paget's disease. Dr. A. Schüller, of Vienna, tells me that he has seen acromegaly associated with Paget's disease in two cases. The sella, partly obscured by the thickening of the right temporal bone, measures 14 mm. in the antero-posterior diameter and is thus within the normal size. It shows, however, some slight irregularity of its floor.

ACROMEGALY AND SPLANCHNOMEGALY

FIG. III.—Radiogram showing gross enlargement of the sigmoid.

In June, 1928, owing to persistence of the abdominal pain, I made a second barium meal examination. This time the stomach was enormously enlarged. It was actually too large to be radiographed on a 12 × 15 film. I then gave a barium enema with the result shown in Fig. III. Two pints of fluid were only sufficient to fill the enormously distended sigmoid, but the upper part of the large intestine was equally distended for, being full of gas, its outline was clearly visible.

The patient died some months later. There was no post-mortem examination.

To sum up, this was a case of acromegaly with unusual bony changes in the skull, together with great enlargement of the gastro-intestinal tract and at least one of the kidneys. The most interesting feature was that the enlargement of the stomach took place during the ten months which elapsed between the two occasions on which I examined her.

The association of acromegaly with enlargement of the viscera is well recognised. Dr. Gordon Holmes kindly informs me that he has observed it, and that in one case he described the colon as being the width of his own thigh. Atkinson,[1] in a review of about 1400 cases of acromegaly, writes: "A very rare pathological condition—namely, enlargement of all the organs—splanchnomegaly must be considered a part phenomenon of acromegaly, as it has been met

with 46 times in this disease and is so extremely rare in any other. It occurs in the liver, spleen, gastro-intestinal tract, kidneys, and nervous system. Some include the heart. The stomach may be huge in some cases and the intestines even twice the normal size."

Theories to account for this curious condition have not been lacking. Amsler [2] believes that "the posterior lobe of the hypophysis becomes excited mechanically by the enlarged anterior lobe or chemically from altered secretion or from both, so that backward pressure arises and thus an increased flow of blood to the organ and consequently enlargement." This, of course, cannot be true, for even supposing that an alteration in the pituitary does cause back-pressure the result would be diminished rather than increased blood flow through the organs. Moreover, organs do not enlarge because of an increased blood flow, apart from the dilatation of the vessels within them. The view of Reinhardt and Creutzfeldt [3] that it is due to an increase of the mesoblast as a result of hyperpituitarism is equally unconvincing. There appears, in fact, to be no adequate explanation of the condition. Defective secretion of pituitrin into the blood stream would explain the dilatation of the stomach and intestine, but not the enlargement of other organs such as the kidney.

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2. Amsler, C.: Berlin klin. Woch., 1912, xlix., 1600.
3. Reinhardt, A., and Creutzfeldt, H. G.: Zeiglers Beit. z. path. Anat. u.z. allg. Path., 1913, lvi., 465.

AN UNUSUAL CASE OF CERVICAL SPINA BIFIDA

BY S. G. ASKEY, M.D. Camb.; and

H. WARNER COLLINS, M.D. Lausanne, B.Sc. Lond., D.M.R.E.

(WITH ILLUSTRATION ON PLATE)

SPINA BIFIDA, a congenital defect in some part of the posterior aspect of the spine, is associated commonly with a hernia of the dura mater, arachnoid, and cerebro-spinal fluid. Normally development of a vertebra takes place from three centres of ossification, one for the body and one for each lamina of the neural arch. These centres appearing about the end of the second month of fœtal life occasionally fail to fuse to form the root of the spinous process. According to the stage at which development is arrested there may be left a narrow fissure of little clinical importance or a wide gap leaving the cord in an open furrow. The former condition unassociated with either protrusion or derangement of any of the spinal contents is often undetected and is called spina bifida occulta. We believe that there is no satisfactory explanation for this defect of development which occurs most commonly in the lumbosacral region where the laminæ fuse latest and which may

FIG. II.—Complete spina bifida.

be associated with an increase in the cerebro-spinal fluid.

Patient A. was discovered by one of us during a routine X ray examination of the cervical area to have bifid spines on the sixth and seventh cervical vertebræ. (See Fig. I. on Plate.) He is a healthy male, aged 45, and was suffering from rheumatic fibrositis in one side of his neck after exposure in a draught. There was no congenital scar or abnormal growth of hair, which is often found in the sacral area overlying bifid spinous processes. We have not been able to find reports of a similar case.

Patient B. illustrates by way of contrast the relatively frequent condition of completely open spine. (Fig. II.)

MEDICAL SOCIETIES

MANCHESTER MEDICAL SOCIETY

A MEETING was held on Dec. 5th, 1934, Dr. E. BOSDIN LEECH, the president, being in the chair. A discussion on

Diagnosis and Treatment of Bronchiectasis

was opened by Dr. W. BROCKBANK and Mr. A. GRAHAM BRYCE.

Dr. Brockbank pointed out that bronchiectasis is far more common than is generally recognised. From the classical type with cumulative fœtid sputum there existed all grades down to one simulating a simple bronchitis. For instance, a dry type was recognised to-day, the symptoms being cough with not more than half an ounce of sputum and hæmoptysis which may be repeated and profuse. In these cases, he said, there is no sign of the typical bronchiectatic sputum, constitutional symptoms are mild or absent, while on examination there may be some slight dullness, impaired breath sounds and râles at the affected base, and in about half the cases clubbing of the fingers. In recent years the diagnosis had been rendered far easier by the use of lipiodol. The condition was bilateral in about 75 per cent. of the cases. Treatment was influenced by the fact that the cavities are surrounded by fibrous tissue which makes it impossible for them to be collapsed except by a major surgical operation.

Artificial pneumothorax had in the vast majority of cases proved a failure. Treatment, which was essentially palliative, necessarily varied with the different types, and had to be largely medical, for the surgeon was only concerned with unilateral disease and most cases were bilateral. In the dry types and those unaccompanied by much expectoration a simple tolu and squill cough mixture and breathing exercises were required. Where the sputum was fairly copious measures must be taken to keep the air-passages as antiseptic as possible. This could be done by prescribing creosote in capsules, in cod-liver oil or, most valuable of all, in the form of an inhalation, best given by means of a Yeo inhaler or, when one is available, in a creosote chamber. Postural drainage was also a valuable adjunct. On this treatment patients did very well and it was possible for the foulest sputum to lose its fœtor, but treatment must be maintained indefinitely. Unilateral bronchiectasis was in suitable cases definitely curable by surgical means.

Mr. Graham Bryce said that in early pulmonary fibrosis following pneumonia, temporary paralysis of the phrenic nerve might be the means of preventing bronchial dilatation, and the operation had been successfully used in America with this object. When the disease was well established but unilateral, three surgical procedures were available—collapse, drainage, and ablation. Artificial pneumothorax and phrenic evulsion had not been found satisfactory in bronchiectasis. Thoracoplasty had a field of usefulness when other measures were not available. It must be more extensive than that usually performed for pulmonary tuberculosis. Bronchoscopic aspiration was a useful palliative; it would never cure the disease. Diagnostic bronchoscopy should always be undertaken in the absence of contra-indications. Cautery pneumonectomy, used largely by Evarts Graham, was a less extensive undertaking than lobectomy. Many surgeons now used the electric scalpel in preference to the actual cautery. Lobectomy was the ideal operation in unilobar cases. Two methods were in vogue—the two-stage method of Alexander and the one-stage operation of Brunn and Shenstone. The mortality has recently been greatly reduced and the operation has established a secure place for itself in the treatment of bronchiectasis.

Dr. R. ELLIS said that in spite of the advances of surgery most cases were still left to the physician. A useful clinical classification was into latent, non-toxic, and toxic types. In the latent and non-toxic types care should be taken to prevent new pulmonary infection. Here the judicious use of anticatarrhal vaccine in the autumn was to be recommended. Bronchiectasis was usually a disease of the young and tended to develop within six months after pneumonia, whooping-cough, or measles. Should there be delayed resolution after these infections breathing exercises or regular inhalations of CO_2 and oxygen were of great value in re-expanding the lung. Injections of antiseptic oily substances such as lipiodol, gomenol, or menthol and guiacol had a beneficial effect in reducing fœtor. They acted principally by stimulating the cough reflex but some remained in the cavities long enough to have an antiseptic action. Intravenous injections of salvarsan and allied preparations were of the greatest value in reducing fœtor due to secondary infection by spirochætes.

REVIEWS AND NOTICES OF BOOKS

Modern Operative Surgery

Second edition. Edited by G. GREY TURNER, M.S., F.R.C.S., F.A.C.S. (Hon.), Senior Hon. Surgeon, Royal Infirmary, Newcastle-upon-Tyne; Professor of Surgery in the University of Durham. London: Cassell and Co., Ltd. 1934. Two vols. Pp. 868 and 896. £3 3s.

TEN years ago this work, edited by the late Mr. Herbert Carson, was first presented to the profession as an authoritative survey of the whole range of modern surgical operations. Mr. Carson's untimely death delayed the production of the second edition, which was then entrusted to Prof. Grey Turner who has more than maintained its high standard. Every chapter has been carefully revised and brought up to date. New sections have been added and more authors have been introduced so as to keep the work abreast of the times. Certain new operations are described and others which have fallen into disuse during the last decade are omitted, the chief aim of the editor being to produce a text-book of operative surgery which will prove a safe guide for beginners in the practice of surgery, and incidentally for those reading for the higher examinations.

The book is however more than a mere guide to surgical technique, for due attention is paid to the considerations which should influence the decision to operate, to make preparation for operation, and for after-treatment, with special reference to the prevention and management of post-operative complications. In the description of the technique of spinal anæsthesia it is stated that the injection may be made "between the second and third lumbar spine, or between the second and first, or the third and fourth." It is surely unnecessary, and may even be risky, to make the puncture at a level above the second lumbar spine.

Several new orthopædic operations have been added, and reference is made to the modern methods of treating fractures by skeletal traction. The chapter on diseases of the rectum has been considerably amplified, and Gallie's technique for the use of fascial grafts in the repair of herniæ is well described and fully illustrated. The account of the operative treatment of malignant disease includes a careful evaluation of the use of diathermy. Revision of the chapters on abdominal surgery has been carried out with nice judgment, based on experience of after results, which has led to the standardisation of the surgical treatment of a given disease at a given site. It might have been well to include in this section an account of Nather and Ochsner's retroperitoneal route for the drainage of certain forms of subphrenic abscess.

The illustrations are beautifully done, many having been redrawn; several new plates and a large number of new drawings have been added. The only pictures which call for criticism are those depicting the incisions for removal of cervical glands; they do not illustrate the incisions recommended in the text.

And now a few criticisms of the teaching. In the description of cordotomy Spiller's original measurements are given and no reference is made to the more recent observations which show the necessity for incising the cord to a greater depth. The account of umbilical hernia does not make it clear that the longitudinal incision is not suitable for the repair of paraumbilical herniæ in adults, and an unfortunate

misprint leaves the description of the Mayo operation still obscure, though the illustration, which was faulty in the earlier edition, has been corrected. The chapter on the surgery of the brain, though considerably amplified, hardly gives a true conception of the advances which have been made in cerebral surgery during the last 15 years.

Prominent features of this edition are the new chapters on the surgery of the chest, on radium, on the surgery of the sympathetic nervous system, and on cleft palate, all of which deserve high praise. It is sometimes said that surgical technique is unlikely to alter to any great extent in the future. The changes which have taken place during the last ten years, as shown by the innumerable emendations and additions to the first edition of this work suggest that the prophecy is false. It seems probable that as operation results are more carefully analysed and as new methods and instruments are devised, operations will tend to become more standardised, simpler, and safer. It will be of interest to see to what extent future editions of this valuable guide to surgical progress confirm the tendency towards standardisation.

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1. Modern Clinical Psychiatry

By ARTHUR P. NOYES, M.D., Superintendent of State Hospital for Mental Diseases, Rhode Island. London: W. B. Saunders Co., Ltd. 1934. Pp. 485. 20*s*.

2. Manual of Mental Diseases

A Text-book for Students and Practitioners in India. By C. J. LODGE PATCH, M.C., Major I.M.S.; Medical Superintendent, Punjab Mental Hospital London: Baillière, Tindall and Cox. 1934. Pp. 332. 10*s*. 6*d*.

3. Aids to Psychiatry

Third edition. By W. S. DAWSON, M.D., F.R.C.P. Lond., D.P.M., Professor of Psychiatry, University of Sydney; late Senior Assistant Medical Officer, Maudsley Hospital for Nervous Diseases, London. London: Baillière, Tindall and Cox. 1934. Pp. 318. 4*s*. 6*d*.

4. Handbook of Psychiatry

By JOHN H. EWEN, M.R.C.P. Edin., D.P.M., Assistant Medical Officer, Surrey County Mental Hospital. London: Baillière, Tindall and Cox. Pp. 267. 12*s*. 6*d*.

5. The Last of the Taboos

Mental Disorders in Modern Life. By ISABEL EMSLIE HUTTON, M.D., Hon. Physician, British Hospital for Functional Mental and Nervous Disorders. London: Wm. Heinemann Ltd. 1934. Pp. 204. 6*s*.

IN the face of such a list, text-books of psychiatry must be presumed to be in demand. Some will regret the continued output of "sound," well-worn expositions and of cram-books. They are not particularly erudite, they say nothing new, and they are of interest only for the beginner in psychiatry. Many of them lend colour to the falsehood that psychiatry is a compost of hidebound description, superficial metaphysics, and facile interpretation. In them the vices of the old "asylum-psychiatry" and the new "metapsychology" may meet in an uneasy union, insipidly dilute, and unstable.

1. Occasionally, however, a text-book appears in which a unified and well-informed presentation is offered. The work of Dr. Noyes is an example of this. From his experience at the Boston Psychopathic Hospital and at St. Elizabeth's Hospital he has had opportunities for becoming familiar with the psychobiological conception which (largely under the influence of Adolf Meyer) has dominated American psychiatry. This provides a coherent framework into which details can be fitted. The author has, however, kept free of minute detail. The bibliography at the end of each chapter indicates wide reading, but the text is for the most part fluent and uninterrupted by references; controversial findings are not stated. In this sense it is not a work of reference, except for the medical student. The author is wise in abstaining from giving a great number of case-histories; the reader will probably be able to draw on his own clinical material for illustration, as in other branches of medicine. The book is a clear, reliable exposition of orthodox psychiatry, though there is less about the physiological and the hereditary aspects than modern views would suggest as appropriate.

2. Major Patch's book is vigorous but limited. It might have been written 20 or 30 years ago. The views expressed are downright, but the attitude to mental disorder is unregenerate when one considers the wider, more dynamic mode of approach that has developed in the last few decades. The psychoneuroses are omitted altogether. The book covers the lectures which the author has delivered at the King Edward Medical College, Lahore; one sees in his amusing anecdotes and direct common-sense style how stimulating he must be as a teacher, and how safe his students are against woolly theorising. It is, however, open to question whether a text-book does not need more than an entertaining style and a shrewd practical judgment, the result of many years' experience. A monograph on the differences between mental disorder among Indians and among occidental peoples would be a work of great value which many passages in his text-book show Dr. Patch to be specially qualified to write.

3. Prof. Dawson's little book, of which this is the third edition, is more complete than its modest title would imply. Its brevity obliges formal and often dogmatic statement, but there is little in the way of essentials that is absent from this compendium. Some of the earlier psycho-analytic views might be omitted with advantage from the next edition, as well as the list of stigmata of degeneration, the description of endocrine changes in dementia præcox, the statement that tryparsamide is still on its trial in the treatment of G.P.I., the reference to delayed development of moral sense and other notions now given up or modified. These are, however, small defects in a remarkably concise little book, which is still the best at the disposal of the hurried student revising his knowledge against an imminent examination.

4. Much less can be said for Dr. Ewen's work which has the same purpose. Psychiatry does not lend itself conveniently to the 1, 2, 3, subdivisions *a*, *b*, *c* method of description. The student who gets his conception of the subject from this book can scarcely help being muddled and ill-informed.

5. Dr. Hutton's book is intended as much for the "thinking members of the general public" as for students and physicians. It is, in brief, a contribution to mental hygiene propaganda and, as such, serves its purpose well. It deals with the whole field in a kind and practical spirit. It shows the usual defects of psychiatric writing for lay consump-

tion. Some of Dr. Hutton's statements are in need of much qualification, she asserts when she should suggest, and she shows a confident optimism which bespeaks an uncritical use of experience. Her preface contains several misstatements. Nevertheless, if one regards mental hygiene propaganda of this sort as desirable, there is no better vehicle of it at present than Dr. Hutton's work which is virtually a text-book of psychiatry for the non-medical reader.

Experimental Bacteriology

In its Applications to the Diagnosis, Epidemiology, and Immunology of Infectious Disease. By Prof. W. KOLLE, Director of the Institute for Experimental Therapy and of the Chemico-therapeutical Research Institute, "Georg Speyer-Haus"; and Prof. H. HETSCH, Professor at the Institute for Experimental Therapy, Frankfort. Translated from the seventh, completely revised German edition by DAGNY ERIKSON. The English version, incorporating further revision, edited by Prof. JOHN EYRE, F.R.S. Edin., F.Z.S., M.D., M.S., D.P.H., Director of the Bacteriological Department, Guy's Hospital. Vol. I. London: George Allen and Unwin Ltd. 1934. Pp. 592. 30*s*.

MOST teachers and serious students of bacteriology are already familiar with this text-book in its German dress. Those who do not read German easily have accustomed themselves to the use of one of a number of excellent English and American books, but will doubtless welcome a translation, for the work has special characters. Compared with some of its competitors it may appear a little old-fashioned and it does not attempt to follow very closely the advancing and ever-changing front of bacteriology. This, however, is not necessarily a fault. Many teachers hold that bacteriology suffers from the last being too often put first. The foundations of any science are indeed laid down slowly and do not shift with every season. Kolle and Hetsch's book is valuable because it maintains an unbroken link between the past and the present of the science. The senior author, at least, was a pupil and fellow-worker of Robert Koch himself and Koch's teaching is evident throughout the work. The style of writing is rather more expansive than that affected by most writers of modern medical text-books, but this allows the subject to be treated from the broadest point of view. In many diseases the bacteriologist, if he will take the trouble, is in a position to see most of the game, and such chapters as those on typhoid, cholera, and plague provide satisfactory clinical as well as bacteriological accounts of the diseases. The English editor and the translator have done their work well and have preserved the pattern of the original. It would be trivial to charge them with a few oversights. The completion of the translation is promised in a second volume.

Lunacy Practice

By GERALD E. MILLS, O.B.E., Barrister-at-law, Assistant Master of the Management and Administration Department; and A. A. RONALD W. POYSER, B.A. Oxon., Barrister-at-law, Clerk of the Management and Administration Department. London: Butterworth and Co. 1934. Pp. 499. 42*s*.

THE Master in Lunacy and his colleagues exercise an important and increasing jurisdiction over the property of mental patients. Two of his staff have now expounded the mysteries of the work which he carries on at the Royal Courts of Justice—the method, for instance, of appointing a "receiver" of the income, the payments to be made from that income, the proper form of the annual accounts, and the safeguards required in the patient's interest. What was nobly known in the reign of Henry VIII. as the Court of the King's Wards, and latterly was more prosaically styled the Lunacy Office, is now (to save the feelings of patients and relatives) called the Management and Administration Department. As certain blithe spirits have reduced this cumbrous title to the significant initials M.A.D., the ideal name has still to be discovered. Though Section 20 of the Mental Treatment Act substitutes euphemisms for "asylum" and "lunatic," no simple and acceptable synonym has yet been found for "lunacy." Thus the 1890 Act remains the Lunacy Act, the Master is still the Master in Lunacy, and Messrs. Mills and Poyser call their treatise "Lunacy Practice." Be the name on the title-page what it may, this is a good book. Many otherwise unreported decisions on procedure are mentioned, and it will save much trouble to persons concerned with mental patients' estates.

The B C G Vaccine

By K. NEVILLE IRVINE, D.M., M.A., B.Ch., M.R.C.S., L.R.C.P., Hon. Physician to the Henley War Memorial Hospital; late Radcliffe Travelling Fellow. London: Humphrey Milford, Oxford University Press. 1934. Pp. 70. 5*s*.

THIS book aims at a comprehensive survey of the B C G problem in a short space. The author has not himself done any experimental work with this organism, but he has spent two years as a Radcliffe Travelling Fellow visiting clinics and laboratories in Europe and America, and as a result of the information thereby acquired he has reviewed the work in as impartial a manner as possible. The book opens with a brief historical summary of previous attempts at immunisation, and then describes the preparation of B C G vaccine. The rest falls naturally into three sections: (1) the question of the possible return of virulence of the Calmette-Guérin attenuated strain in vitro, in animals, and in man; (2) the degree of immunity afforded by the vaccine both in animals and in man; and (3) a discussion and summary. From his examination of the first point, the author concludes that B C G is not a "virus fixe" but can (or could until recently) increase in virulence when suitably grown. Although it occasionally produces progressive tuberculosis in laboratory animals it has not yet, according to the evidence produced, been proved to have caused progressive tuberculosis in man. That a definite degree of immunity may be produced in cattle seems also to have been established, but the results in other animals are not so clear. Dr. Irvine concludes that a certain increase of immunity is produced in man by B C G vaccine, but that it is impossible to say whether enough protection is produced to warrant the reorganisation of our present comprehensive scheme for dealing with tuberculosis in favour of a prophylactic vaccine. With this conclusion we think most of his readers will agree. He is, however, prepared to advocate the use of B C G vaccine for children living in tuberculous families in order to supplement the existing measures of protection.

The book is a fair and reasonable summary of a very thorny question, and Dr. Irvine is to be congratulated on having threaded his way through the

vast literature which has accumulated in the last ten years and successfully emerged to sensible conclusions at the end.

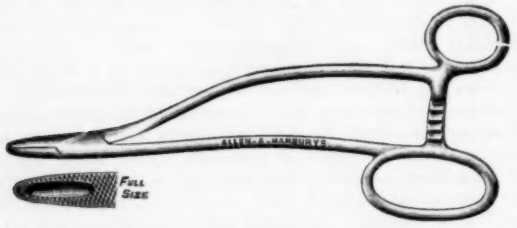
British Journal of Children's Diseases

IN the October–December number (vol. xxxi.) Dr. E. W. Goodall continues his Story of Tracheotomy, discussing the diseases for which the operation was performed or recommended, and the evolution of the technique and instruments employed.—In the second part of his paper, entitled An Analysis of over Four Thousand Cases of Educational Deafness Studied during the last Twenty-five years, Mr. Macleod Yearsley divides the cases of educational deafness due to acquired diseases into four groups—viz., those due to (1) disease of the central nervous system, (2) the acute exanthemata and other infectious diseases, (3) primary ear disease, and (4) injury.—Dr. Ian Taylor contributes a paper on the Dick Test and Measles Complications, based on a study of 227 cases of measles, of which 119 were Dick-positive and 118 Dick-negative. He comes to the conclusion that a lack of circulating streptococcus antitoxin, as indicated by a positive Dick reaction, is associated with a slightly increased liability to broncho-pneumonia, and a very greatly increased risk of the broncho-pneumonia being fatal. Otorrhœa developed rather more frequently in the Dick-positive cases than in the Dick-negative. The laryngitis occurring among Dick-positive cases was more severe than among the Dick-negative.—Mr. R. Rutherford and Dr. J. H. Follows report a case of Congenital Valvular Obstruction in the Prostatic Urethra, which terminated fatally at the age of 11 months.—In his paper, entitled Some Pædiatric Eponyms—(VII.) Fowler's Solution, Dr. W. R. Bett gives a history of this preparation, popularised but not invented by Thomas Fowler (1736–1801), physician to the Stafford General Infirmary.

NEW INVENTIONS

A NEW NEEDLE HOLDER

I HAVE been using the needle holder described below for over three years and I have found it efficient. It is a modification of Waugh's needle holder, and has the advantage of simplicity. The action resembles that of the ordinary artery forceps, so that one easily acquires dexterity in its use. It is readily distinguished on the instrument table from an artery forceps by its shape and its finger rings. These are large, one being large enough to take three fingers,



which allows comfort and power in work. The shanks are long and bowed, so that besides the mechanical advantage, the fingers work in an uncramped position and at their greatest power. The bowing of the shanks acts like a spring when the needle is powerfully grasped and this prevents the needle being broken in the jaws of the holder. Each jaw face is slightly hollowed. The jaws grip the needle long before the ratchet comes into use, so that in working a continuous stitch there is no delay in locking and unlocking and the movement of the jaws in this manœuvre is avoided. The ratchet is useful for the assistant or nurse by which to hand the needle holder loaded, with a threaded needle, to the operator.

The needle holder can be used with any type of needle, but it is best used with the half-curved type of needles. I have these needles constructed with almost square-shaped bodies, the concavo-convex surface being flattened to within one-quarter of an inch of the tip. This completely prevents any tendency of the needle to turn in the needle holder either in inserting or withdrawing the needle. The needles are made with round points or short trocar points, and are from 2 in. to 1 in. long. The small ones are made of such calibre as to take a number 1 catgut. For a difficult perforation I use the 1 in. round-pointed needle and for sewing up a laparotomy wound a round-pointed needle 1¾ in. long for the peritoneum, and a trocar-pointed needle of the same length for the sheath of the anterior rectus.

The needle holder was made to my instructions by Messrs. Allen and Hanburys Ltd., Wigmore-street, London, W.

GEO. D. F. MCFADDEN, M.Ch., F.R.C.S. Eng.

Belfast.

A NEW HEADLAMP

NOTWITHSTANDING the convenience of modern self-illuminating instruments, an efficient headlamp still holds an important place in the surgeon's armamentarium. In the vast majority of cases the part requiring intensive illumination is small in area, whether it be a vessel in the tonsillar fossa or part of a cavity from which the prostate has been removed. Any extraneous illumination not only detracts from the concentration of light on the required spot, but is likely to be reflected by specula or other instruments, to the discomfort of the surgeon.

The ideal headlamp should be light and comfortable, and must not slip on the head held in any position. It must throw a powerful beam of even illumination over a field of approximately half an inch, at a distance of 1 foot from the projector lens. The projector should be mounted on a ball-joint in the same horizontal plane as the surgeon's eyes, the beam thus almost coinciding with his line of sight. The projector must be kept within reasonable dimensions.

Having failed to find a headlamp on the market fulfilling these conditions, Messrs. F. Davidson and Co., of Great Portland-street, London, have made one for me complying with these requirements, and I have found it ideal in examinations of and operations on the ear, nose, and throat, as well as in all cases where a powerful local illumination is necessary.

Winchester. B. H. PIDCOCK, F.R.C.S. Eng.

PRINCE OF WALES HOSPITAL, TOTTENHAM.—The first section of the new nurses' home of this hospital has been opened by Sir Albert Barratt, chairman of the governing body.

THE LANCET

LONDON: SATURDAY, JANUARY 5, 1935

RELIEF ON A SOUNDER BASIS

THE New Year has brought with it a new spirit in the administration of public assistance. The time is not far distant when the Pauline injunction "If a man will not work he shall not eat" was interpreted if not in the letter at all events in the spirit, for if he were out of work and wanted to eat he could only do so by becoming a pauper and surrendering his rights as a citizen. The stigma of worklessness has now gone for good, and with it the stigma of pauperism. At the same time the basis of unemployment benefit is no longer the individual; it has been replaced by the needs of the family unit, no member of which can now gain or suffer without the other members gaining or suffering too. The scale of assistance drawn up by the Unemployment Assistance Board on the instruction of the legislature is supposed to be based solely on the determination of need. In thus saying farewell—so far as the majority of the unemployed are concerned—to the poor-law régime it must not be forgotten that it offered certain advantages which are now no longer available. While the object of the relieving officer may have been in part to deter the work-shy, there were in the background the unpaid and leisured guardians of the poor whose local knowledge and experience were at the disposal of their wards. The relief was sometimes niggardly but the recipient always had the prospect of a further instalment of help when required. While the final assessment may be adjusted to meet special circumstances, the assistance offered by the new Board seems to be the limit of social aid; given and accepted as a citizen's right there is none other on which to fall back. Substantially true though this may be of the situation which arises on March 1st next, there is one definite exception in regard to resources other than earnings. Milk or other special nourishment such as cod-liver oil, provided at school or elsewhere, is to be ignored in reckoning up the assets of the family, as well as the supply of meals up to two per day for a single child. As regards medical relief, maternity, child welfare, and tuberculosis services, any payments or allowances in kind will also be ignored. There are many who would put pressure on the Board to extend this principle and in assessing the family resources to place no limit on the exemption for free meals and milk.

The new spirit of assistance may be seen not only in the manner of giving it but in the method of basing it on inquiry, comparison, and generalisation. In two respects the new scale may lay claim to be scientific. When drawing it up Sir HENRY BETTERTON (whose name appears in the New Year Honours list this week) and those associated with him were able to use recent large-scale surveys of national feeding; and although the scale was presented to the House of Commons to accept or reject as a whole, it will nevertheless be judged in the light of how it works, with a view to possible readjustment later when difficulties have become manifest. In preparing the present scale the Board must have had before it two recent estimates which have commanded much public attention. The B.M.A. scale was based on a man-value of 3400 calories and on the need for a relatively large supply of first-class protein for the younger members of the family. This scale at first appeared definitely more generous than that laid down by the Ministry of Health's own advisory committee on nutrition, but discussion showed that there was no substantial disagreement as to the all-round average requirements of the entire population, or as to the necessity for a large proportion of the total protein to be derived from sources such as milk, eggs, cheese, meat, or fish. The distinguished group of physiologists and physicians whose considered view was set out in our own columns and elsewhere last August urged the Board to lay down a scale of needs in accordance with known physiological requirements, and to base the standard on expert opinion qualified to estimate the minimum requirements of healthy living and the cost of satisfying them for families of various sizes. It is disappointing therefore that in presenting the draft the Board should not have taken the public into its confidence in regard to the principles on which it was drawn up. Yet in its grading it is clearly an advance on anything that has gone before, and we have the statement that it embodies the results of a sample inquiry into 7000 cases tabulated under various headings such as income, rent, number of children, amount of relief granted, and other relative points. The Board has taken the largest group among its claimants, namely the married couple with one child, and, as the Government spokesman suggested, has astonished even the Labour Party by proposing a weekly allowance of 4*s*. for this child, however young. When there is more than one child in the family the allowance is not less than 3*s*. for the youngest child; and for the first time, as the Minister of Labour pointed out, the principle has been accepted in a parliamentary measure that the allowance should increase with the age of the child. Reduction for quantity begins when any household reaches more than five members; there has been sharp criticism as to whether there is real economy in numbers, whether indeed there can be any material saving in overhead costs on a number of children when the budget is so near to subsistence level. This is another point on which experience may lead to modification.

Any government must have in mind the disastrous results of making public assistance too attractive which followed the "Speenhamland Act" of 1795 and led to the strict deterrent policy of the reformed Poor Law from 1834 onwards. The new scales of assistance may be criticised as

still falling below the established minima required for health and decent livelihood, but they will be above the level of wages earned by some men with families employed in certain trades. From the public health point of view the only solution of this problem is a raising of the level of such wages, and improved scales of assistance may have this effect. But the social and industrial implications might be of such a nature as to affect adversely the national economy, and so reduce the capacity of the country to maintain a generous measure of relief for a swollen body of unemployed. The new system and the new scales, although barely adequate for the maintenance of the health and self-respect of its beneficiaries over a prolonged period, are more liberal and more rational in their conception than any central or local provision hitherto made. We should watch their effect on the national well-being with more optimism if there were any sign that the same courageous and scientific approach were being made to a restoration of prosperity and a rapid absorption of the unemployed in industry, trade, and the professions. The medical care of the unemployed and their families is another aspect of public assistance which cannot be left permanently dangling between national insurance and public assistance. The absence of any comprehensive scheme for maintaining continuity of medical care for the unemployed is a grave defect in this new régime of centralised public assistance.

TOWARDS THE ÆTIOLOGY OF CANCER

More than 30 years ago A. Borrel, one of the pioneers in the experimental study of cancer, published a study entitled "Epithélioses Infectieuses et Epithéliomas,"[1] in which he compared the epithelial lesions resulting from known virus infections with the epitheliomata. He concluded the paper with the sentence, "Il y a analogie, il n'y a pas identité." But he argued at the same time that the similarity was sufficiently striking to make the conception that a virus is responsible for the cellular proliferation of a malignant neoplasm a possibility which deserved serious consideration, and should not be excluded on a priori grounds; and in a paper published in 1907[2] he prophesied the direct transmission of a malignant growth without the intervention of living cells. But since all attempts to accomplish such a transmission with mammalian tumours had failed—and have failed ever since (unless one accepts W. Cramer's experiments on the successful transmission of a mouse sarcoma subjected to repeated freezing and thawing)—Borrel's views were disregarded. Even the demonstration in 1911 by Peyton Rous of the transmission of a fowl sarcoma by an extract filtered through a Berkefeld candle did not succeed in breaking down the resistance to a virus theory of cancer.

It is mainly owing to the work of Gye in this country that such a conception became a matter of serious debate. Last year C. H. Andrewes in his Oliver Sharpey lectures on viruses in relation to the ætiology of tumours[3] resumed Borrel's analogy between epithelial lesions due to viruses and malignant neoplasms. The transition between these two groups was represented by the filtrable papilloma occurring in wild cottontail rabbits which has been described recently by R. E. Shope under the title Infectious Papillomatosis of Rabbits.[4] As the name implies, the disease is clinically an infectious wart recurring spontaneously in wild cottontail rabbits in Iowa. Unlike the infectious warts of dogs and of man, the rabbit papilloma does not as a rule undergo spontaneous regression and in that respect resembles neoplastic proliferation. Histologically it is a typical papilloma, the cells of which show no inclusion bodies. It can be transmitted experimentally by rubbing an extract filtered through a Berkefeld candle into the scarified skin of normal wild rabbits, and also of normal domestic rabbits, although the latter represent a different genus. There is however one significant difference between the papillomata transmitted experimentally to the wild and to the domestic rabbit. Filtered extracts from the papilloma induced in the wild rabbit are always active in inducing a new papilloma in other rabbits, whether wild or domestic. But a papilloma induced in a domestic rabbit no longer yields an active extract and cannot be transmitted either to a wild or to a domestic rabbit. The agent or virus can induce a papilloma in a domestic rabbit, but when it has accomplished this its presence in the growth can no longer be demonstrated. The domestic rabbit papilloma behaves therefore like a mammalian benign tumour although its ætiology is that of a virus disease, while the wild rabbit papilloma resembles in its behaviour the filtrable fowl tumours. The virus is exceptionally resistant to heat. It withstands heating to 65° C. for 30 minutes, and is destroyed only by heating to 70° C. When a rabbit has been infected with a virus, so that a papilloma is formed, the animal develops an immunity against the virus: its serum is now capable of neutralising the fluid containing the virus. Moreover a rabbit with a papilloma is more resistant against a second infection with the virus, so that a second infection will be either negative or will require a longer time for the appearance of a second papilloma. This immunity is specific for the virus of this particular growth, and does not extend to the viruses responsible for two other types of cellular proliferation in the rabbit—namely, the benign fibroma virus and the myxoma virus. Nor does this immunity prevent the successful autotransplantation of the cells of the infectious papilloma as has since been shown by Rous.

The investigation of this interesting disease has been continued by Peyton Rous, who, with his collaborator J. W. Beard, has just published his results.[5] Their object was to determine the relationship of this epithelial tumour, known to be induced by a virus, to the malignant tumours of mammals.

[1] Ann. de l'Inst. Pasteur, 1903, xvii., 81.
[2] Le Problème du Cancer, Bull. de l'Inst. Pasteur, 1907, v., 497.
[3] The Lancet, 1934, ii., 63, 117.
[4] Jour. Exp. Med., 1933, lviii., 607.
[5] Ibid., 1934, lx., 701, 723, 741.

With this aim in view they have carried out a large number of highly ingenious experiments. It is not possible to give here a complete account of these and of the close reasoning applied to their interpretation, and a few examples must suffice. It is clearly shown that the virus is specific for the epithelial cells of the rabbit's skin, and attacks these only if they have been traumatised by such procedures as scarification or injections of Scharlach R. The virus does not attack the cells of other organs of the rabbit, nor does it attack the traumatised epithelial cells of the skin of other species of animals. As indicated by the name the papilloma grows ordinarily without infiltrating the underlying tissues. But by various devices, designed to break down the resistance of the connective tissue, it has been possible to induce the papilloma to infiltrate the neighbouring tissues in a manner analogous to true malignant new growths. The most striking results were obtained by the presence of bacterial infections at the base of the growth. In the domestic rabbit the papilloma increases in size by a multiplication of its own cells and not by infecting the neighbouring epithelium: it "grows out of itself," another characteristic feature of true malignant new growths. Although the tumour in the course of its growth may invade blood-vessels and lymphatics, it has not been found as yet to produce metastases in distant organs. Nor has it been possible to transplant the papilloma from one domestic rabbit to another. But while homotransplantation has so far failed, autotransplantation has been successful, that is to say, the cells of a papilloma induced in the skin of rabbit A can be made to grow in other tissues and organs of rabbit A, but not in the tissues and organs of rabbit B, whether rabbit B is a normal animal or is carrying a papilloma. If the cells of the papilloma are introduced into organs such as liver, kidney, muscle, they multiply, forming solid tumour masses which by their expansive growth destroy the normal tissue in which they lie, again closely simulating the behaviour of a metastatic epithelioma. Successful autotransplantation of cells cannot, however, be used as an argument in support of their malignant or quasi-malignant character. Autotransplantation can be performed without difficulty even with normal cells. One of the characters which distinguish malignant cells from normal cells is the possibility of transplanting the former into another animal of the same species, and even this property is not peculiar, since benign tumours can occasionally be transplanted homoplastically. At the same time the authors are justified in pointing out that not every spontaneous malignant neoplasm can be homoplastically transplanted, and that this process is particularly difficult to bring off in keratinising epitheliomata. The behaviour of the infective rabbit papilloma, so far as its transplantability is concerned, gives therefore at present no very clear indication of its relationship to true malignant neoplasms.

If the evidence presented by the American authors is critically analysed we may say with BORREL: "il y a analogie, il n'y a pas identité." ROUS and BEARD have succeeded in showing that a virus is capable of inducing an unlimited proliferation in the epithelial cells of a mammal, and, further, that when such a proliferation has been induced the presence of the virus is no longer demonstrable. The argument that the virus theory is not admissible for mammalian tumours until the presence of a virus has been demonstrated experimentally loses therefore much of its force, and in view of the evidence presented by the filtrable fowl tumours it becomes increasingly difficult to exclude the possibility that the continued proliferation characteristic of malignant cells is caused by a virus. At first sight it might appear as if such a conception must necessarily revolutionise our whole outlook on cancer. The continued opposition to such a theory—even in the face of the evidence presented by the filtrable fowl tumours—is largely attributable to the argument that the adoption of a parasitic ætiology as a short cut to the solution of the cancer problem is not compatible with many essential features of the disease. Indeed, the Shope tumour can be used with equal force to exemplify its differences from, as its analogies with, malignant new growths. The disease is endemic; there is a clear history of infection (the causative organism entering from without); there is a uniform lesion as specific as that of other virus diseases or of some other organismal infections such as syphilis; the type of proliferation is usually benign; it is limited to the epithelium of one tissue; there is no spontaneous metastatic spread; the period of induction is short, so that the age-incidence characteristic of cancer is absent. These features distinguish the Shope tumour clearly not only from the malignant tumours of mammals but also from the filtrable fowl tumours. Even if we accept for the sake of the argument the conception that the unlimited proliferation of malignant cells is due to the presence of an intracellular virus, the ætiology of cancer must be a much more complex one than that of a simple virus disease. The work of the last ten years on experimental carcinogenesis makes it possible to resolve this difficulty. When cancer of the skin is produced by painting the skin with pure chemical substances, and even more so when mammary cancer is produced in male mice by the repeated injection of œstrin over a long period, the development of malignancy cannot be attributed to the introduction of a virus from without. If we accept a virus as being responsible for the intimate cellular change constituting malignancy, we have to postulate that the virus is ubiquitous and existed previously within the animal and probably within its cells, which are the natural habitat of most viruses, without manifesting any pathogenic activity. The part played by the carcinogenic substances must be to render the cells susceptible to the pathogenic action of the virus. This is conceded by ROUS and BEARD, and indeed by the other workers who in recent years have tried to establish the virus theory of cancer.

The ætiology of cancer presents two separate problems—namely, the nature of the intimate cellular change responsible for the limitless and autonomous proliferation of the malignant cell,

and secondly the manner in which this cellular change is brought about. In the light of our present knowledge we can see that a virus theory of cancer and a cellular theory of cancer are not mutually exclusive. In fact, whatever conception can be formed of the part played by a virus in the causation of cancer, it presupposes the existence of cellular changes in the absence of which the virus cannot act, and these cellular changes have an ætiological significance which is at least equal to that of the virus, while from the practical viewpoints of the incidence, treatment and prevention of cancer it may be even greater.

EARLY TREATMENT IN G.P.I.

ACCUMULATED experience has now demonstrated that the discovery of a bacterial origin for a disease does not dispose of the question of its pathogenesis. When in 1913 it was shown that general paralysis of the insane was always due to syphilitic disease of the brain, the problems of causation and treatment were opened up rather than solved. By a daring experiment in clinical medicine the treatment of the disorder has been advanced beyond all hopes, but the empirical method here has owed nothing to the discovery of the spirochætal origin of the disorder except in so far as it has made for earlier and more accurate diagnosis. The problems of causation have latterly been concerned with the special incidence of the spirochætal infection on the central nervous system and the special modes of response of this system to the infection. In a recent communication Dr. F. H. HEALEY [1] raised some of these issues, and he has now published in pamphlet form his observations [2] on 303 cases which accord in the main with general clinical experience. The explanations for some of the clinical phenomena recorded are still to seek. Dr. HEALEY finds, for example, that those of his patients with the shortest latent periods between primary infection and manifestation of syphilitic psychosis had had inadequate treatment with arsenical preparations intravenously. He does not go on to suggest, as other writers have done, that such treatment is more likely to lead to G.P.I. than no treatment at all, and that the greater frequency of the condition in this century is attributable to the introduction of intravenous therapy with salvarsan. This attractive hypothesis has now been disproved on several grounds, the most recent evidence against it being that obtained by K. BERINGER among the people of Transbaikalia. Though in this region there is practically no antisyphilitic treatment, syphilis of the nervous system is by no means rare. Dr. HEALEY also insists on the great frequency with which he found syphilitic changes in the cardiovascular as well as in the nervous system. This familiar observation suggests to him that the mediastinal and posterior cervical lymph glands have harboured spirochætes which after a long period of latency ascend by lymphatic paths to the spinal cord and brain as well as to the heart and aorta. The evidence for such a view is as yet inconclusive, but even if it be correct it does not account for the limited number of cases of syphilis in which nervous or circulatory lesions become manifest or for the time of onset. Dr. HEALEY's suggestion to account for these is unconvincing: "Ernest Jones has demonstrated that certain people have undue sensitivity of their internal organs, and if this state is very well marked, hypochondriacal symptoms will result. These psychasthenic people when infected with syphilis complain of the lesions according to the more sensitive system, and thus the diagnosis is determined to a cardiac or nervous state. In general one would expect an earlier outcry on the part of the nervous system, as it shows a more sensitive reaction to disease." And in another place he says that "the main cause for the development of syphilis of the central nervous system, especially with mental symptoms is a subnormal brain and a psychopathic disposition."

More serious efforts to deal with the constitutional problem in this disorder have been made by various investigators, notably Pernet, Jahnel, Meggendorfer, in the attempt to determine what part inherited immunity reactions play in determining incidence on the central nervous system, and what hereditary basis there is for particular modes of response, in respect both of minute structure and morbid function. It is pretty clear that the clinical form whatever it may be, expansive, melancholic, neurasthenic, catatonic, will depend on inherited predispositions, but that the simple demented forms represent a universal human response to the presence of such destructive changes in the brain as those of syphilis. Whether the incidence on the central nervous system depends similarly on inherited attributes or on some still unspecified environmental conditions or on a special strain of spirochæte is still quite dubious. Points for and against are adduced by clinicians, geneticists, and laboratory workers. Dr. HEALEY makes the point, familiar to all psychiatrists, that the grandiose "classical" type of G.P.I. is by no means the rule nowadays. If this could be more generally recognised the benefit of modern treatment by malaria and tryparsamide or the like would be available to many patients whose malady is not now recognised. Early treatment is so imperative that delay through failure of diagnosis is more than a regrettable accident; it may make the difference between an almost complete recovery and the mere arrest of an advanced psychosis when treatment means not a longer active life but a socially worthless and humanly tragic death-in-life, dragging on for 10 or 20 years. Modern treatment, especially when given late, may give rise to a spurious recovery. The patient goes on, forgetful, improvident, irritable, even murderous in his rages but perhaps uncertifiable; or he becomes a permanent dement who survives for many years in a mental hospital. The more widespread the familiarity with the various aspects in which syphilis of the brain may show itself, the earlier will treatment be instituted and the less often will such an outcome be observed.

[1] THE LANCET, 1934, ii., 350.
[2] Syphilis in Relation to Psychosis. By F. H. Healey, M.D., B.Sc., D.P.M., Birmingham: Oman 1934.

During the last ten years a considerable activity in trying new methods of treatment has borne but little fruit. Malaria remains the most effective means of dealing with G.P.I. Many other infections have been tried, such as relapsing fever and rat-bite fever, as well as inoculation with the virus of rabies and with vaccines and proteins of various kinds. Sulphur and turpentine have each been used to bring about fever; diathermy and more recent physical devices (e.g., short wave radiations) have been turned to the same purpose. O. NAEGELI in his clinic at Berne has attempted to reinforce malarial treatment by the injection of herpetic virus. But in spite of the attraction which new measures exert on many minds, malaria, perhaps conjoined with tryparsamide, is still the method of choice. The statistics quoted for some other procedures might be taken as indicating equal efficacy, but here as elsewhere in therapeutics it is only after sceptical repetition and by general consent that their value can be assessed. Judged by these requirements, malaria holds the field.

THE DIGESTIBILITY OF FOODS

WHICH foods are easily digestible, and why? This is a question that has called forth as many wrong answers as any other in medicine; and though there are certainly some wide gaps in our knowledge the prevalent confusion of thought is not entirely due to lack of reliable information. Almost every book on dietetics offers lists and tables of the gastric emptying-times of almost every form of common foodstuff, whether eaten alone or in mixtures. The data thus reproduced are many of them derived from experiments carried out by M. E. REHFUSS and his colleagues at Philadelphia, recorded in the *American Journal of Physiology* from time to time since 1914; and these experiments have brought out a number of important facts about digestion in the normal stomach. REHFUSS has shown, for example, that broadly speaking there is for each individual a constant type of gastric function—either a slow or fast—and that each of us tends to maintain this type all through life. The time the stomach takes to empty depends, he has found, both on the kind of food, and, to a less extent, on the quantity swallowed; for the average person it is about four hours, and it rarely exceeds five.

So much for the normal. REHFUSS's latest observations,[1] however, are concerned with gastric digestion in 50 persons suffering from chronic organic diseases, and their object was to determine how far the function of the stomach is affected in chronic illness. The patients included many to whom a light diet would ordinarily be prescribed on the assumption that their digestion must necessarily be impaired—e.g., sufferers from long-standing diseases of heart, lungs, or kidneys. The method of investigation was to withdraw small fractions of the gastric contents two hours after meals of beef, of beef and potatoes, and of beef, potatoes, and butter, and to continue such observations until the stomach was empty. The results, briefly summarised, show that in these "chronic invalids" 100 g. of beefsteak was evacuated from the stomach in an average of just under four hours; the same amount of steak mixed with 100 g. of potato took about three minutes longer, and the addition of 40 g. of butter to the meal prolonged the emptying by about eight minutes. The acid secretions in response to these three types of meal showed relatively little difference, the last giving a somewhat higher acidity than the pure protein meal of steak alone. Such figures indicate that the stomach retains its efficiency remarkably well in the presence of serious organic disease elsewhere in the body, and that a mixed meal of protein, carbohydrate, and fat passes through it but little more slowly than one of pure protein or of protein and carbohydrate. Hence so far as gastric digestion is concerned there is little truth in the popular fad that starch and meat are incompatible in the stomach.

A small series of careful observations described by Dr. MAILE and Dr. SCOTT in our present issue confirms REHFUSS's findings as regards gastric emptying-time in a few normal subjects. The method used was one that has been employed in other fields of gastro-enterology: barium was mixed with the foods and the time taken for the stomach to empty was ascertained by radiography. This method again shows that an ordinary meal leaves the stomach in about four hours, whilst *abnormally* large amounts of fat taken with food delay its progress very considerably. So far as these observations go they also support the opinion (now generally accepted) that the sensation of hunger is not dependent either on gastric peristalsis or on the exact quantity of food in the stomach. Clinical studies of hunger have always pointed the same way, but the view that hunger is solely a gastric sensation seems to be a long time a-dying. From the practical standpoint the drawback to all these investigations on the stomach is that it is all too easy to apply them as if they represented "digestibility of foods" instead of gastric emptying times and acid secretions. Unfortunately it is when we come to digestion and absorption in the small intestine that our ignorance becomes greatest and most serious. It is common knowledge how little defect of digestion there may be in the absence of any gastric hydrochloric acid—as in achlorhydria and even in true achylia—or in patients whose emptying-times may have been much altered by partial gastrectomy or gastro-enterostomy. In fact clinically it is strange how little relation gastric acidity and gastric emptying-time often bear to actual digestibility of foods as evidenced by symptoms of "indigestion" or their absence.

[1] Jour. Amer. Med. Assoc., Nov. 24th, 1934, p. 600.

HUNTERIAN SOCIETY.—The Hunterian lecture of this society will be delivered at the Mansion House, London, E.C., on Monday, Jan. 14th, at 9 P.M., by Dr. H. H. Kessler, associate orthopædic surgeon to the Newark (New Jersey) Beth Israel Hospital, and assistant orthopædic surgeon to the Newark City Hospital. Dr. Kessler will speak on Rehabilitation Surgery. The hon. secretary of the society may be addressed at 26, Upper Wimpole-street, W.1.

ANNOTATIONS

VISCERAL SENSIBILITY

THE application of the experimental method to the study of the symptoms of disease is the only line of approach to the problem of visceral pain. Certain simple forms of sensation may be studied up to a point by experiments upon lower animals, but the analysis of the complicated reactions involved in visceral stimulation and the resultant sensation is an intricate matter calling for intelligent coöperation on the part of the patient, and critical scrutiny on the part of the observer. At the outset it must be admitted that misunderstandings can and do arise between different observers if care is not taken to describe methods and to express findings with precision and in language which allows of no ambiguity.

The importance of this point is illustrated in a recent communication by Dr. Charles Bolton, F.R.S.,[1] entitled "Observations on Referred Pain," in which he records a very careful investigation of a large number of patients suffering from gastric and duodenal ulceration. Only the briefest reference is made to the spontaneous referred pain of which the patients complained, and the main object of the paper is to bring forward evidence that the *tenderness* elicited by palpation of the abdomen is localised to the peripheral terminations of the thoracic nerves, and is not situated over or even close to the ulcer. He brings forward these observations in confirmation of the work of Sir James Mackenzie, and to refute the claims recently made by John Morley that the tender area is accurately localised over the ulcer, and moves with it when the stomach alters its position in the abdomen as a result of changes in the patient's posture. It appears at first sight that the results obtained by Bolton and by Morley are so exactly contradictory that one of them must of necessity be wrong; but more careful consideration leads one to suppose their sharp disagreement may arise from the different methods they have employed in eliciting tenderness. Morley referred to *deep* tenderness felt in response to stimulation of the parietal peritoneum in contact with the ulcer, the same tenderness which is elicited by the radiologist who, when screening the stomach, demonstrates the tender spot over the ulcer by pressing the anterior abdominal wall against it, and squeezing it against the posterior wall of the abdomen, employing considerable force in carrying out this manœuvre. Bolton, on the other hand, is concerned with the tenderness which the clinician brings out by gentle palpation of the abdominal wall. These areas of tenderness to light palpation were situated in the middle line between the xiphosternum and the umbilicus in 21 out of 23 cases of gastric ulcer, and in 11 out of 13 cases of duodenal ulcer, though almost all the gastric ulcers were proved to lie to the left of the midline and almost all the duodenal ulcers to the right. Whereas in every case the ulcer moved upwards in the abdomen when the patient lay down, the position of the tender area did not alter. Another striking piece of evidence was obtained from the study of 13 patients with functional disturbances of the stomach in whom there were tender areas in the anterior abdominal wall which were indistinguishable from those occurring in cases of ulcer, though the stomach was shown to be free from organic disease. Bolton therefore concludes that since the tender areas in the abdominal wall correspond to the terminations of the thoracic nerves there must be an irritable focus in the corresponding segment of the spinal cord, and that the irritation is due to afferent impulses received through the sympathetic nerves from the stomach.

It is noteworthy that Bolton's work, though strongly supporting Mackenzie's main doctrine, includes some observations which throw considerable doubt on his idea that the higher the tender area the higher would be the ulcer on the lesser curvature of the stomach. Some of the highest gastric ulcers in Bolton's series occurred in association with a tender area just above the umbilicus, and in half the cases of duodenal ulcer there was a tender area just below the xiphosternum. These facts may yet prove of great value in helping to map out the afferent paths from the stomach, though at the moment they appear to add to the confusion by running counter the commonly accepted idea that the upper portions of the alimentary canal, including the stomach, send their afferent nerves to the higher segments of the spinal cord.

[1] Brain, 1934, lvii., 211.

THE MANAGEMENT OF BREECH PRESENTATION

As a subject for discussion at obstetric societies the correct management and delivery of the breech presentation is a hardy annual, and the rival policies of "early interference" and "leave alone" nearly almost certainly determine an acrimonious, if somewhat unsatisfactory, battle of words. The endless repetition of arguments without any generally accepted conclusion being reached will doubtless continue until some of the protagonists substantiate their doctrine with convincing statistics of results. Some attempt to supply these has recently been made by Dr. C. W. Marshall and Dr. J. W. Burns, working at the Liverpool Maternity Hospital, whose studies on the management of breech presentation have already been recorded in our columns.[1] In the current issue of the *Journal of Obstetrics and Gynæcology of the British Empire* Dr. J. W. Burns describes a method of dealing with the after-coming head in which he explains clearly a mechanism, rarely understood by medical students, whereby the head should be born by a process of flexion. Whatever opinion may be held as to the special merits of Dr. Burns's method, it is certainly logical and as safe as any other. Dr. C. M. Marshall in the same journal gives a full account of his technique for the delivery of the breech with extended legs in primiparæ. The essence of this technique is the removal of the obstruction that hinders the birth of the child—that is to say, the perineum—by performing a medio-lateral episiotomy after the injection of a local anæsthetic. The results of the year's work in breech presentation in the Liverpool Maternity Hospital are supplied. This presentation was complicated by extended legs in primiparæ on 28 occasions. Only one infant was stillborn, a mortality of 3·6 per cent. Of the total number of breech deliveries—72—that were uncomplicated by contracted pelvis or placenta prævia, only 2 fœtal deaths occurred, a fœtal mortality of 2·77 per cent. There was no maternal death and the puerperium was morbid in only one case. Such results are extraordinarily good; they show a fœtal death-rate of about one-tenth of that recorded by G. F. Gibberd as the gloomy outcome of a study of results of breech labour in eight English hospitals.[2] It is possible the Liverpool figures may be equalled

[1] See THE LANCET, 1934, i., 953.
[2] Brit. Med. Jour., 1931, ii., 369.

or even bettered in the practices of a few individuals, but for institution practice they are remarkable. If figures in any way comparable can be reproduced by other obstetric hospitals who adopt the Burns-Marshall technique, Dr. Marshall will be justified in his contention that no midwife should be allowed to undertake a breech labour unassisted. He might have added that the delivery would not be easy in any private house, for it involves the maintenance of the lithotomy position, the injection of a local anæsthetic, administration of a general anæsthetic, and the making and repair of the episiotomy. It is still a matter of dispute in the highest obstetric circles whether such abnormal midwifery as delivery of breech presentations is not as safe to mother and child when conducted in the patient's home as it is in an institution. The evidence that the full resources of a hospital are desirable is strengthened by the excellent results obtained at Liverpool.

EXERCISE TOLERANCE IN EFFORT ANGINA

To aid in the diagnosis, and assess the severity, of angina pectoris, Riseman and Stern [1] make use of a small staircase, 18 inches high and consisting of two steps. Patients are made to mount and descend the steps under conditions standardised in respect of temperature, time, and the size of the previous meal, recent attacks of angina, and recent exertion. The method has the advantage that the exercise is one with which everyone is familiar; and the effect of training, which might lead to variable results with other means of measurement—such as the bicycle ergometer—is excluded. The patients were allowed to choose their own rate of performing the test, and the number of trips made on the staircase and the time elapsing between the beginning of the exercise, and the onset of definite pain in the chest were noted. Experiments were made on 57 cases diagnosed as having angina pectoris, and these brought out several interesting points. A definite sequence was observed during the test: after a certain amount of exercise, varying with the person, discomfort was experienced which was not enough to make the patient stop; from this point, however, the discomfort gradually increased and after a further 2–10 trips it suddenly became intense. This marked the end-point of the test. Usually dyspnœa was now obvious, but cyanosis, flushing, and pallor were never seen. In some of the cases the duration of the test was definitely shorter at first than when it was performed again later, the difference being presumably due to the influence of excitement. Observations made on 15 patients to ascertain the effect of the surrounding temperature showed striking variations in 4; the pain developed quickly in a room kept at 46°–58° F., whereas at a temperature of 75°–81° F. exercise was limited by symptoms other than pain. When the results of tests made with the patient fasting were compared with those obtained after a light meal no significant differences were noted; and observations made on three patients 20 minutes after a heavy meal showed reduced capacity for exercise in one only. The well-known action of nitroglycerin in increasing capacity for exertion was confirmed, and the exercise tolerance within a few minutes of experiencing anginal pain was also studied. No constant sequel was noted; in about equal proportions, the amount of work which could be accomplished was either unchanged, increased, or diminished.

As a rule the diagnosis of angina is based on the patient's description of his symptoms, and in most cases probably a confident diagnosis can be made at once. In others, however, the features are atypical, and the diagnostic problem may certainly be sometimes soluble by means of a simple test, to which no danger attaches, such as the one described—more conclusively, no doubt, if it is made in a cold atmosphere. However skilful the physician's cross-examination, a patient's replies may be such as to leave the diagnosis uncertain; on the other hand, all doubts will be resolved if an attack can be provoked and witnessed. Nevertheless, in early and mild angina the patient is at times capable of quite strenuous exertion, and failure to induce pain on one occasion by an exercise test could by no means be held to exclude its existence. Under controlled and standardised conditions, the amount of work required to call forth pain in any given person seems to remain remarkably constant over periods of months. Such a test may therefore be used in assessing the value of any treatment given.

THE TEMPERATURE OF BATS

HIBERNATION has always been a source of interest to physiologists, not only as a phenomenon, but as a phase in the life of warm-blooded animals which might be the key to secrets of metabolism and temperature regulation. A paper in the last number of the *Journal of Physiology* [1] records some observations on horseshoe and noctule bats, showing that there is no apparent difference between the sleep which these animals take during the day in the summer, and that into which they fall in the winter. During ordinary diurnal sleep, their temperature drops practically to the level of that of their surroundings, and when subjected to stimuli they may chirp and bite and perform slow "reptilian" movements. If the air temperature is not too low, and the time of day suitable, these movements may start a rise of body temperature which rapidly mounts higher and higher as further movements and shivering take place. The maximum temperature attained seems to depend entirely on the amount of exercise taken by the animal, for if the animal flies round the room the temperature may attain 41° C. The authors conclude that there is no regulation of temperature to a constant level in these bats; it is determined entirely by muscular activity, perhaps reinforced by an outpouring of hormones, and may only be prevented from rising too high by the enormous wing surface exposed to air-cooling during flight. Even during hibernation it is probable that the bats occasionally wake up and feed. However, no rational explanation of hibernation appears. Certainly it is stated that bats are more difficult to rouse the colder they are, and at first sight this would seem a reasonable clue to their winter behaviour. But during the summer they sleep during the day, and wake in the evening, so that although the character of diurnal sleep may be the same as that of winter sleep, the former at least must be initiated by some cyclical changes independent of temperature. The large fruit bat, of tropical origin, is stated never to drop fully asleep in captivity, and always to be exhibiting some kind of movement, usually shivering. In consequence, its temperature never falls to that of its surroundings, and although very variable is generally above 33° C. The authors point out that in this animal a fall in external temperature is clearly a stimulus to muscular activity and

[1] Riseman, J. E. F., and Stern, B.: Amer. Jour. Med. Sci., November, 1934, p. 646.

[1] R. C. Burbank and J. Z. Young: Jour. Physiol., 1934, lxxxii., 459.

internal heat production, and they regard this as an important step forward towards the completely warm-blooded condition.

MARIJUANA CIGARETTES

A NEW form of narcotic menace has lately been causing concern in the United States and in Canada. As is well known, the hemp plant (*Cannabis sativa*), grown in temperate climates for its fibre and seed, when cultivated in warmer regions yields, by virtue of the resin from its flowering tops, the narcotic drug cannabis indica. As hashish, ganjah, bhang, and churras, it has for centuries been used in the Orient, either as an intoxicating drink or smoked like tobacco, and its tendency to cause its addicts to "run amok" has added the word as-assin to the vocabulary. *C. sativa* has now appeared in the new world in the form of marijuana cigarettes. According to the *Canadian Medical Association Journal* for last November (pp. 544 and 561), in Detroit, in New York, and in Montreal and Ottawa these cigarettes, heavily charged with Indian hemp, are on sale in cabarets and night clubs and are even being hawked about to young boys and girls and are peddled in dance halls. It is stated by our contemporary that "the traffic in Indian hemp has attained the proportions of an industry with widespread ramifications." It appears that the Harrison Act of the United States, which restricts the traffic in narcotic drugs, does not include Indian hemp in its provisions. Canadian legislation, following the lines of the later Dangerous Drugs Acts of Great Britain however covers this trade, and active steps have been, and are being, taken by the Narcotics Division of the Department of National Health, supported by the police, in laying bare the illicit traffickers and securing their salutary punishment. It is surmised that the successful restrictions which, through the League of Nations, have been placed on the traffic in morphine, heroin, and cocaine have led to greater resort to Indian hemp by those who profit by pandering to the addicts in narcotic drugs, and there is probably some truth in this apprehension.

METICULOUS AMPUTATION

THAT stimulating personality, Prof. René Leriche of Strasbourg, has lately hinted [1] that were surgeons to think as well as operate, the discipline thus imposed on themselves might prove beneficial to the subjects of amputations. The trouble, he thinks, goes back to the surgeon's early days when he practises these operations on the dead body. A comprehensive, circular slash, and the deed is done—in record time. Applied to the living body, this ritual has meant a performance as highly coloured as a bull-fight. Prof. Leriche, on the other hand, expects all his assistants as well as himself to complete an amputation without being splashed by one drop of blood. This means Esmarch's bandage, dissection instead of slashing, and immediate ligation of every severed blood-vessel, however small. By the saving of blood thus effected he believed that convalescence may be shortened and even death averted. Turning to the main nerve-supply, in amputations of the thigh for example, Leriche maintains that the future welfare of the patient depends much more on the sciatic nerve and on the way it has been treated than on the sculptural dexterity with which the surgeon has moulded the stump so as to conform to some terminal standard. Of all the tissues divided during an amputation, the only ones which attempt an embarrassing regeneration are the nerves, which may begin to give trouble as long as fourteen years later. The patient may get about happily enough with an ugly stump but not with one which is very painful; and Prof. Leriche is experimenting with means of discouraging proliferation of the neuroglia of axis cylinders. Before dividing the main nerve of a limb he injects novocain, and he has also injected 90 per cent. alcohol and carbolic acid into the central end of the divided nerve. He still does so, but is not yet certain of the effects. He has also attempted to anastomose one divided nerve with another, but the results of this experiment have not so far been very happy. Another subject for investigation is the effect on the blood and blood-forming organs of suddenly removing a large area which has hitherto required much blood. Leriche has noticed that the amputation of one leg is apt to be rapidly followed by a rise of blood pressure in patients who become plethoric. This cannot, he thinks be for want of exercise, for the same sequel does not follow crippling by pseudo-arthroses of the hip.

[1] Presse méd., Nov. 7th, 1934, p. 1737.

SALT IN THE TREATMENT OF HEAT CRAMP

SOME ten years ago Prof. K. N. Moss, who is professor of mining, coal, and metal, at Birmingham, made a contribution [1] to medical knowledge which, perhaps because he is not a medical man, has not attracted as much notice as it deserves. He observed that men working in certain mines frequently complained of painful and often disabling muscular cramps. He found that the air in the mines in question was unusually hot and humid, the dry bulb thermometer registering temperatures of 98° to 102° F., the wet bulb 83° to 87° F. In such an environment perspiration is of course prodigious—as much as 18 lb. of sweat may be lost in a single shift—and the thirst of the miner proportionately great. The cramps come on after the perspiring miner has slaked his thirst with water. Moss inferred that the cramps were due to disturbance of salt and water equilibrium in the body, for the miner loses both salt and water during sweating, but replaces only the latter when he drinks. If the water imbibed is retained, as it is, it follows that the body fluids must tend to become hypotonic. The correctness of this inference was shown by inducing the miners to drink dilute saline instead of water, when no cramps followed. Heat cramps are said to be commoner in miners who have drank heavily before working. This is not surprising, for it is common knowledge that a man with a taste for ale does not always stop drinking when his thirst for fluid quâ fluid has been slaked.

Apart from providing a simple solution to an important practical problem, Moss's work is significant in other ways. To the physiologist it affords a clear illustration of the truth of Claude Bernard's dictum that an unvarying internal fluid medium is the first essential to animal life. To the clinician it offers hope that some of the forms of cramp encountered in practice might respond to a treatment which is so simple that it may well have been overlooked. In this connexion a recent paper by E. H. Derrick is interesting.[2] He records several instances of muscular spasm similar to miner's cramp occurring in road workers and cane cutters in Northern Queensland. Profuse sweating followed by too liberal drinking was presumably responsible, although the effect of salt was not noted. He also describes some instructive observations on a man suffering from advanced chronic nephritis who complained of severe cramp of the limb muscles. On the advice

[1] Proc. Roy. Soc., B., 1923, xcv., 181.
[2] Medical Jour. of Australia, 1934, ii., 612.

of his miner friends the patient had tried taking salt and had noticed prompt relief, although his œdema naturally increased. Derrick repeated the experiment and found that salt was indeed effective in relieving the cramp. Since ammonium chloride was found to give no relief, it may be inferred that the sodium ion is at least as important as chloride. Painful cramps resembling tetany are, of course, well known in uræmia and are usually ascribed to hypocalcæmia. The beneficial effect of sodium chloride suggests that this explanation is inadequate. It is not likely that salt will do more for the nephritic than ease his pain, but more detailed studies of the effect of various inorganic ions on uræmic spasms might well throw light on the pathogenesis of tetany. There is a widespread suspicion that tetany is not always a simple expression of hypocalcæmia.

CÉSAR ROUX

By the death of César Roux at Lausanne on Dec. 21st, at the age of 77 years, international surgery loses one of its most remarkable figures. Born in 1857 at Mont-la-Ville in the Jura, Roux remained all his life a Vaudois in speech and sympathies. He learned his surgery under Theodor Kocher at Berne and soon came to excel his master in speed and ingenuity. At the age of 30 he was placed in charge of the surgical service at the Lausanne Hospital and five years later became professor of surgery in the University. Though he wrote almost nothing he was a great innovator in surgical technique, and Lausanne soon became a place of surgical pilgrimage. Behind this professional achievement was a human being of singular attraction. "Though almost dwarf in stature," writes one of his old pupils, "César Roux had a tremendous personality. His great dexterity, shrewdness, and above all his innate kindliness, inspired unbounded affection and admiration in those who were fortunate to know him; though his devoted assistant and students could be rooted with terror at his scathing tongue. His energy was amazing: he taught daily for two hours at 7 A.M. in summer and 8 A.M. in winter to a packed audience in the demonstration theatre. His essentially practical teaching was hampered by a system whereby the ward work was almost entirely post-graduate. From the students Roux expected common-sense and common observation; the man with extensive text-book knowledge but devoid of the principles of clinical examination was apt to have a bad time when first called in to examine a case in the theatre. And Roux's teaching was not a thing to be forgotten. He used to enrich our poor experience with Rabelaisian anecdotes, with chalked diagrams which seemed to grow in the round, and with a magnificent opportunism. One night the electricity of the whole town failed; next morning at 8 we were shown the living remnant of the workman who shorted the circuit. Once Roux showed us, under deep narcosis, a raving young beauty of 17, stark naked as a Greek statue, with fulminating pelvic gonorrhœa; with dramatic effect he hurled responsibility into his great complacent audience. Who else than Roux would have called on four students of aristocratic name to examine a little girl with 7 in. of prolapsed rectum, solely to give point to a hereditary factor in ætiology? or would have chosen the slenderest finger of the women students to palpate a vesical papilloma per urethram? The appearance in the class of an English student equipped with a bare two months' ward experience was featured for the benefit of his own students in such a way as to leave no doubt concerning the method he preferred. With him it was always 'what do you *feel*?' Sometimes he would operate on a case which had just been demonstrated, and such operations readjusted the visitor's sense of values. Clearly it was, after all, 'surgical' to burrow in the abdomen wearing gloves of coarse white cotton; to spit on the floor, frequently and with vehemence; to forgo much anæsthesia and all elaborate preparation. Patients might and did loudly protest—('Yes, Madam, I finished long ago; but my assistants are so inefficient that I have to keep starting all over again'); but his dexterity was such that they felt quite well the next day. He was firm and gentle with all patients, reserving his irritation for his assistants—whose efficiency was in fact normal. Roux was himself fearless, honest, and quite intolerant of meanness; it is said that when a distinguished colleague who called him in consultation to Paris suggested sharing his fee Roux agreed at once, adding that his railway fare was 50 francs and his fee 5. A casual acquaintance, meeting him in the street and angling for a free consultation, was told to close her eyes and open her mouth, when Roux slipped away and left her gaping on the main bridge of Lausanne. His home was entirely pleasant to visit; his wife, a fellow-student from Berne—one of many expatriated Russian Jewish intellectuals—was an admirable hostess. There were two brilliant daughters, a physicist and a surgeon, a former much-abused assistant. Roux's thick silvery hair, big moustache, and spectacles made him look like a fierce helpful gnome from Grimm's fairy-tales. His picture in the municipal art gallery showed a younger man with fiery red hair. He had been an energetic reformer, and came at last under the ban of one of his own reforms, retiring when his abilities were still at their height and no one could wish him to go. The final loss of this shrewd and lovable little man, with his sharply intelligent mind and his peasant dialect, impossible to follow exactly yet so vividly expressive, is mitigated only by the fact that he has long become a heroic legend."

CÉSAR ROUX

Photo by de Jongh, Lausanne

AN INTERNATIONAL CONGRESS OF GASTRO-ENTEROLOGY

The first international gathering to merit this title will be held in Brussels from August 8th to 10th under royal patronage. Dr. J. Schoemaker is the president, and Dr. Georges Brohee (64, Rue de la Concorde, Brussels) is secretary-general; the treasurer is Dr. F. Evely (239, Rue Royale Sainte-Marie, Brussels), to whom intimations of desire to become a member of the congress should be addressed and who will receive subscriptions. The honorary president of the English committee is Sir William Hale-White, the president Dr. A. F. Hurst, and the secretary Dr. Thomas Hunt (12, Queen Anne-street, W.1). The members of the English committee are: Dr. A. Abrahams, Dr. T. L. Hardy, Mr. J. P.

Lockhart-Mummery, Mr. John Morley, Dr. J. W. McNee, Dr. J. A. Ryle, Dr. C. K. Simpson, Sir Edmund Spriggs, Prof. W. W. D. Thomson, Dr. H. L. Tidy, Mr. A. J. Walton, and Prof. D. P. D. Wilkie. It is obviously intended to make the congress a representative one. The movement will be supported by the four universities of Belgium, the Université Libre, the University of Ghent, the University of Liége, and the Catholic University of Louvain.

RESULTS WITH RADIUM

THE National Radium Commission this week issue a report on radium treatment in cancer of certain sites,[1] prepared by Mr. R. W. Raven, F.R.C.S., their registrar of statistics, and his statistical assistant, Mr. A. E. C. Hare, Ph.D. The conditions studied are carcinoma of the breast, cervix, lip, and tongue and floor of the mouth. The investigation is only preliminary, for it is confined to cases treated in 1930, and the survival-rates are thus based upon a three-year experience in place of the five years that the Commission hold must elapse before the value of radium treatment can reasonably be estimated. It forms a useful guide, however, to the progress being made and to the way in which the data are being collected and analysed. Care has been taken (as is well known) to ensure that adequate case-records are kept at all centres and to secure an examination of patients in the follow-up departments on the anniversary of the beginning of treatment. Of the 1325 comprised in this study only 64, or just under 5 per cent., have been lost sight of. The principle method of appraisement adopted is the net survival-rate—"the proportion of patients who are alive, irrespective of the presence of disease, to the total number of patients treated, including those who have died of operation, but deducting from the sample the number of patients dead from causes other than carcinoma and patients lost sight of." This measure applied to 557 patients with carcinoma of the breast gives a percentage net survival-rate of 37·7 at the end of three years, but very large differences are apparent according to the stage the disease had reached when treatment began. Of those classified to Stage I. (limitation to the breast) 64 per cent. were alive; of those in Stage II. (axillary lymph glands invaded) 39·9 per cent.; and of those in Stage III. (more widespread disturbance) only 24·9 per cent. Such differences emphasise the deplorable fact that at the beginning of treatment very nearly half the patients belonged to Stage III. and in only one-fifth was the disease localised to the breast. A comparison of cases treated with radium alone and those treated with radium plus excisional surgery shows no significant differences with patients in Stages I. and II., but in Stage III. there is a distinct difference in favour of radium combined with excisional surgery, the survival-rates being 22·4 per cent. with radium alone and 38·7 per cent. with radium plus surgery. The numbers in the latter group are somewhat small (44 cases) but the difference is more than that likely to have arisen by chance. A very similar result is given by the comparison of cases treated with interstitial radium and those treated with interstitial radium plus excisional surgery. These results are compared with those obtained by excisional surgery at St. Bartholomew's Hospital,[2] and it is seen that in Stage I. the three-year survival-rates are of the same order; in Stage II. surgery gives a slightly inferior result (34·5 per cent. survival against 40·2 with radium alone and 42·6 with radium plus excisional surgery); while in Stage III. the patients are at first inoperable, but improvement is often seen after radium therapy, so that they become suitable for excisional surgery. It is encouraging that the survival-rate obtained in these Stage III. cases treated by radium combined with excisional surgery (38·7 per cent.) is not inferior to that of Stage II. cases treated by surgery alone (34·5 per cent.).

During 1930 there were 590 patients with primary carcinoma of the cervix uteri treated with radium. These are divided into four stages of disease, only a fifth being found in the earliest group and just over half in the two advanced groups. The three-year survival-rate falls progressively from 60·8 per cent. for patients in Stage I. to 48·1 per cent. in Stage II., 32·6 per cent. in Stage III., and only 11·8 per cent. in Stage IV. Patients in Stages I. and II. treated on the "Stockholm" principle show better results than those treated by all other methods (the numbers are too small to allow subdivision of the latter). There is a suggestion that those under fifty years of age have a lower survival-rate (35·6 per cent.) than those of fifty and over (42·9 per cent.), but the difference is not more than might have arisen by chance, and one cannot at present accept the authors' conclusion that the prognosis is obviously worse amongst the younger patients. Of 94 cases of carcinoma of the lip 60 per cent. survived three years, the rate being nearly twice as high when the disease was localised to the lip as when the regional lymph glands were involved. A total of 406 patients were treated for primary carcinoma of the tongue and the floor of the mouth; of the former only 19·6 per cent. survived three years, of the latter 37·5 per cent. Large differences are, as always, apparent between the results obtained at different stages of the disease. The chief method of treatment has been interstitial irradiation, but practice varies as to the way the affected regional lymph glands are treated. As the number of patients increases further subdivisions of the data will become possible, and thus in time these statistics should throw a much clearer light on the best ways of carrying out radium therapy.

THE NEW YEAR HONOURS

On page 58 will be found the names of the members of the medical profession who have received New Year honours. But in addition to those so recognised who have a place on the Medical Register, there are others on the list whose work has been discharged either in close alliance with medicine or in fields where their activities make for the promotion of medicine. The Marquess of Linlithgow, who becomes a Privy Councillor, is the chairman of the Medical Research Council. The Earl of Athlone, who receives the Royal Victorian Chain, is Chancellor of the University of London, of which university Mr. Edwin Deller, LL.D., who receives a knighthood, is the Principal. Prof. Edward Bagnall Poulton, F.R.S., is a life president of the Royal Entomological Society and Emeritus Professor of Zoology in the University of Oxford. Sir Henry Betterton, who becomes a peer, is chairman of the Unemployment Assistance Board. Mr. Charles Vernon Boys, F.R.S., the well-known physicist, has been knighted. Mr. Richard William Harris, secretary of the London School of Hygiene and Tropical Medicine, receives the O.B.E., as does Miss Priscilla Sanderson, matron of Mount Vernon Hospital for Cancer.

[1] Preliminary Report on Radium Treatment in Cancer of Certain Sites. Appendix to the Fifth Annual Report of the National Radium Commission. London: H.M. Stationery Office. 1934. Pp. 40. 9*d*.

[2] Raven, R. W.: St. Bart.'s Hosp. Rep., 1933, lxvi., 45; see THE LANCET, 1934, i., 62.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XXXIV.—PROGNOSIS IN NEPHRITIS

PROGNOSIS in nephritis must always be guarded. Whenever the diagnosis can be made with certainty there is a possibility that the disease may terminate the patient's life in a few years, months, or even weeks. On the other hand, cases exhibiting most alarming manifestations, with renal insufficiency present in high degree, may recover with surprising rapidity. For these reasons extremes of optimism or pessimism are seldom justified and dogmatism never so.

The varieties of nephritis add to the difficulties of prognosis. A case may be acute or chronic, and in either alternative hæmaturia, albuminuria, œdema, hypertension, or renal insufficiency with nitrogen retention may be the predominant feature, or a combination of several of these factors. The assessment of prognosis must depend on an appreciation of the significance of each and all.

There is no doubt that the management of a case of nephritis may profoundly affect prognosis; salt-free diets, low-protein diets, the removal of septic foci, the proper treatment of acute left-sided cardiac failure, and the general management of the life of the patient, are measures which may be decisive in determining survival. If "cure" in Bright's disease is seldom more than a possibility, it is at the same time true that treatment is to-day more effective and of greater importance than in many other serious diseases.

Acute Nephritis

Here the most important point to bear in mind is the essential distinction between focal nephritis and diffuse glomerulo-nephritis.

FOCAL NEPHRITIS

Cases of focal nephritis have a relatively excellent prognosis. They usually arise as a complication during the course of an infectious disease such as acute tonsillitis, scarlet fever, measles, pneumonia, typhoid fever, or malaria. They are characterised particularly by hæmaturia, and by the fact that the renal complication occurs when the infection is at its height. Œdema and hypertension are absent and renal function is normal. Pathologically the condition represents more or less numerous localised inflammatory lesions in the glomeruli, tubules, and interstitial portions of the kidney. The subsidence of the renal signs with the disappearance of the primary infectious process is indicative of the benign nature of the disease.

ACUTE GLOMERULO-NEPHRITIS

This is a diffuse process affecting every nephron in both kidneys. It tends to manifest itself at the end of an infectious disease, during convalescence, or without obvious antecedent cause. Of more than 450 cases reviewed by Fishberg, nearly 50 per cent. followed streptococcal infections of the throat or scarlet fever, 10 per cent. were associated with suppurative conditions of the skin, and nearly 20 per cent. were of entirely unknown ætiology.

Death during the acute stage of this disease is not common but probably occurs in about 5 per cent. Uræmia, acute dilatation of the heart, and secondary infections are the chief sources of danger; complete suppression of urine and the appearance of convulsions are the signs of gravest prognostic import. After the period of immediate danger the prognosis is much better and, particularly in young people, complete resolution occurs in fully 80 per cent. of carefully treated cases; optimism is only justified when the major manifestations of the disease, hæmaturia, albuminuria, and hypertension have completely subsided. Persistent hypertension is the most adverse sign and progressive renal sclerosis is threatened as long as this sign persists.

It is especially in acute nephritis that treatment has the greatest bearing upon prognosis; the correct management of a case, particularly as regards the appropriate limitation of food and fluid, is often the deciding factor in determining recovery; in other cases the timely removal of important foci of infection may be responsible for cure, whilst neglect of such treatment may be followed by permanent renal damage.

THE VALUE OF TESTS OF RENAL FUNCTION

Present-day laboratory methods for the estimation of renal function, such as blood analysis, urea-elimination tests, tests of the concentrating power of the kidney, or such combinations of these as determination of the Ambard constant or the urea-clearance test of Van Slyke, enable the observer to obtain fairly exact information concerning the degree of efficiency of the kidneys at any given moment. It must be emphasised that these are of relatively little value in assessing the prognosis in any individual case. I have observed complete recovery in cases of acute nephritis in which such tests revealed a renal efficiency of less than 30 per cent. on several occasions. It may be stated categorically that in all cases in which these tests reveal impairment of renal function the prognosis must be based far more upon the underlying cause of renal impairment than upon the degree of such impairment. The popularity of these tests at the present time makes it expedient to emphasise this point, because it is to be feared that much fallacious prognosis is being based upon such laboratory examinations.

Chronic Nephritis

If prognosis in acute nephritis is to a large extent governed by treatment, prognosis in chronic nephritis depends upon precision in diagnosis. For this purpose I adopt in the following paragraphs a classification which is receiving increasing support in English speaking countries and recognises three main groups:—

(*a*) *Ischæmic nephritis*, in which renal change is secondary to a generalised arterial condition.

(*b*) *Nephrosis*, in which there is albuminuria, without hæmaturia, without vascular change, without impairment of the capacity for urea concentration, without nitrogen retention, but usually with reduction in the plasma proteins and often with chronic œdema.

(*c*) *Chronic glomerulo-nephritis*, in which there is evidence, direct or indirect, of primary renal disease.

Prognosis is very different in these three main groups.

ISCHÆMIC NEPHRITIS

The prognosis in ischæmic nephritis is that of essential hypertension modified by the fact that the kidney is known to be impaired. If the case presents itself simply as one of chronic hypertension with albuminuria but no diminution in the concentrating power of the kidney, as determined by the specific gravity tests or tests such as those of MacClean or Van Slyke, the prognosis will depend on other factors such as age, chronicity, evidence of cardiac disease, and so

forth. But if, in addition to a slight albuminuria, the tests of renal function reveal that the concentrating power of the kidney is failing or that actual nitrogen retention is present, the outlook is very grave indeed. Amongst all the cases meriting the diagnosis of essential hypertension death from uræmia is a relatively rare event and even amongst those in whom albuminuria is seen to develop, uræmia does not often occur; it must further be remembered that albuminuria in such cases may be an expression of impaired renal circulation from cardiac failure. But in the small group in which there is evidence of definite impairment of renal function the prognosis is always very grave and death from uræmia frequently occurs within a few months or years, or repeated attacks of uræmia may be an outstanding feature in the terminal months of the disease. The appearance of retinitis is a particularly ominous sign when it is found in a member of this last group, and survival for more than two years is very rare.

NEPHROSIS

In nephrosis the prognosis is relatively good. The unsolved problems of ætiology and pathology which this name conjures up, such as whether it is a disease per se or whether it applies to a group of cases of chronic nephritis with invisible glomerular lesions, does not affect the prognosis. Provided that the case presents the full characteristics of nephrosis there is seldom any immediate risk to life. Œdema is the outstanding manifestation and when chronic carries with it certain risks. Apart from the impairment of general health, it makes its victims particularly subject to intercurrent infections; the presence of accumulations of albuminous fluid in the tissues makes the patient a walking culture medium, and as such he may acquire a fatal local infection such as cellulitis or peritonitis. It must be emphasised that the disease is a rare one, and although certain authorities such as Epstein claim to have seen many complete recoveries this has not been my experience. Careful treatment with appropriate diet will often lead to the disappearance of the œdema and the patient is able to pursue his occupation for many years, but the complete disappearance of albuminuria is a rare event and constant vigilance is often necessary to prevent a relapse of œdema. A few cases are of syphilitic origin and in these the appropriate treatment usually leads to complete cure.

CHRONIC GLOMERULO-NEPHRITIS

In chronic glomerulo-nephritis the prognosis is always grave. It has already been stated that in acute nephritis complete recovery occurs in a high percentage of cases, but when evidence of nephritis, even in the form of continued slight albuminuria, persists, the possibility of complete recovery after the first 12 months is very remote. The degree of invalidity which will ensue and the actual duration of life are often extremely difficult to assess. The three factors of major value in arriving at a decision are: (*a*) the presence or absence of hypertension; (*b*) the presence or absence of retinitis; (*c*) the degree of impairment of renal function.

Progressive or severe hypertension in chronic glomerulo-nephritis means not only that dangerous hypertensive phenomena such as cerebral thrombosis may supervene, but also that progressive sclerotic change is present in the kidneys. In actual fact the termination in such cases is usually due to uræmia, and impairment of renal function will usually become obvious in such cases within a few years.

Retinitis is an even graver sign. If the eye changes are merely those of "hypertensive encephalopathy" they may subside with the disappearance of the acute hypertensive crisis, but if they are of that type which has long been erroneously labelled "albuminuric retinitis" a prognosis limited to a few months or years at most usually proves correct.

Impairment of renal function.—When loss of concentrating power, nocturnal polyuria, or actual nitrogen retention in the blood proclaims the advent of renal failure, the life of the patient is not likely to extend for more than a year or two. At the same time, this event may occasionally be postponed for a much longer period. In all cases of chronic glomerulo-nephritis with some impairment of renal function, repeated biochemical observations become of great prognostic value. The very limited value of such tests in acute nephritis has been noted; conversely, it must be stressed that estimation of renal function at intervals of some months, or even yearly, by means of such tests as the urea-clearance test, or by estimation of the concentrating power of the kidney as determined by careful specific gravity tests, enables the physician to determine whether the downward progress is rapid or sustained. When such tests reveal that the renal function is stationary or deteriorating only very slowly, the patient may live with health only slightly impaired for many years; on the other hand, when actual nitrogen retention is once established, fatal uræmia usually appears within two years.

Complicating factors.—In cases of the "nephrotic syndrome," in which glomerulo-nephritis is known to have originated the disease, the prognosis will be determined by the closeness of the resemblance to pure nephrosis. If hypertension is present the prognosis immediately becomes worse. Finally, it must be borne in mind that chronic nephritis carries with it particularly serious prognosis in women during the childbearing period; pregnancy can never occur in such a patient without the gravest risk to the life of the mother.

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BIRMINGHAM AMALGAMATION.—In future the board of management of the Birmingham General Hospital will be joined with that of the Queen's Hospital. This amalgamation came into force on Jan. 1st.

SPECIAL ARTICLES

MORTALITY FROM PERNICIOUS ANÆMIA IN ENGLAND AND WALES

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THE treatment of pernicious anæmia by the method of liver therapy was introduced in this country in 1927 and the immediate success attendant upon it has been shown by various workers. In particular a careful examination of the registered death-rates has been made by P. L. McKinlay both for England and Wales[1] and for Scotland.[2] In both countries he found that between 1921 and 1926 the mortality experienced showed no appreciable change from year to year, or, in other words, that prior to the new method of treatment the death-rate from pernicious anæmia was, to all effects and purposes, stationary. In 1927 the death-rate showed a slight decline, derived especially from a fall in mortality in the final quarter of the year. In 1928 the records showed

TABLE I

Standardised Death-rates per million from Pernicious Anæmia in England and Wales from 1921–26 *to* 1933*

Year.	Death-rates per million.		Death-rates as percentage of rates in 1921–26.	
	Males.	Females.	Males.	Females.
1921–26 ..	57·6	70·5	100	100
1927 ..	56·1	68·8	97	98
1928 ..	37·2	48·0	65	68
1929 ..	40·2	48·6	70	69
1930 ..	43·8	51·5	76	73
1931 ..	42·2	53·6	73	76
1932 ..	48·3	60·8	84	86
1933 ..	44·2	56·3	77	80

* Standardised by the *direct* method with the census population of England and Wales in 1921 as standard.

a very substantial improvement in the death-rate, affecting both sexes and increasing consistently throughout the year. This secular trend of mortality, closely associated in time with the new method of treatment, clearly indicated the efficacy of liver therapy, and led McKinlay justifiably to predict "that extension of the treatment to a still larger proportion of patients suffering from the disease will be reflected in further decline in the mortality attributed to this cause." In Scotland up to 1931 this further decline has been recorded, as McKinlay has shown.[2] In 1931, however, some set-back took place, an increase in the death-rate being noted in each of the four quarters of the year, and this does not appear to be a merely temporary set-back for the number of deaths debited to pernicious anæmia showed a further slight increase in 1932 (from 285 in 1931 to 317 in 1932).

MORTALITY STATISTICS OF ENGLAND AND WALES, 1921–1933

In England and Wales the course of the death-rate since the low level of 1928 cannot, however, be regarded with satisfaction. Its trend is shown in Table I. and Fig. 1, and it is clear that the mortality of both sexes has risen between 1928 and 1933.

[1] THE LANCET, 1929, ii., 1086.
[2] Seventy-seventh Annual Report of the Registrar-General for Scotland, 1931, Appendix V.

In 1928 the standardised death-rate of males was 35 per cent., and of females 32 per cent., below their 1921–26 level; in 1933 both death-rates were still appreciably below those of 1921–26—namely, 23 and 20 per

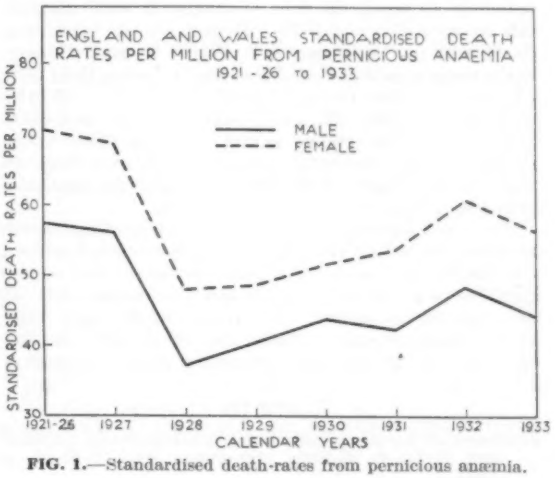


FIG. 1.—Standardised death-rates from pernicious anæmia.

cent., but, on the other hand, they were distinctly above the low levels of 1928. In 1933 the standardised death-rate from pernicious anæmia of males in England and Wales was 44·2 per million, or 19 per

TABLE II

Standardised Death-rates per million from Pernicious Anæmia in the Administrative Divisions of England and Wales from 1921–26 *to* 1933*

Year.	London (administrative county).		County boroughs.		Other urban districts.		Rural districts.	
	MALES							
1921–26	34·4	(100)†	59·7	(100)	64·4	(100)	57·5	(100)
1927 ..	39·4	(115)	57·8	(97)	61·6	(96)	54·1	(94)
1928 ..	18·2	(53)	37·8	(63)	45·0	(70)	34·7	(60)
1929 ..	30·8	(77)	39·7	(74)	45·1	(72)	38·4	(69)
1930 ..	21·9		48·9		47·6		41·4	
1931 ..	26·4		39·4		45·3		49·4	
1932 ..	29·2	(80)	50·3	(76)	52·8	(75)	47·6	(82)
1933 ..	27·3		46·6		46·8		45·0	
	FEMALES							
1921–26	41·8	(100)	72·6	(100)	75·8	(100)	75·8	(100)
1927 ..	40·3	(96)	76·7	(106)	71·0	(94)	70·1	(92)
1928 ..	25·1	(60)	47·4	(65)	53·4	(70)	52·5	(69)
1929 ..	29·7	(67)	49·2	(71)	51·7	(70)	54·7	(73)
1930 ..	26·4		54·6		54·5		55·6	
1931 ..	24·1		52·9		58·7		62·5	
1932 ..	35·4	(65)	61·4	(80)	66·9	(83)	63·5	(81)
1933 ..	22·6		59·9		62·1		58·6	

* See footnote to Table I.
† Figures in parentheses are percentages. As the yearly deaths in the divisions are somewhat few the averages of the death-rates of 1929 and 1930, and of 1931, 1932, and 1933 have been taken to measure the trend.

cent. in excess of their rate in 1928 (37·2 per million); the standardised death-rate of females in 1933 was 56·3 per million, or 17 per cent. in excess of their rate in 1928 (48·0 per million). The improvement in mortality from pernicious anæmia in England and Wales that synchronised with the introduction of liver therapy has, therefore, not only failed to increase with the further passage of years but has failed even to maintain its initial level, in spite of the fact that "the methods used in the liver treatment of pernicious anæmia have been greatly refined and improved and new substances have been discovered—e.g.,

the preparations of hog gastric tissue, which have proved quite as effective as those of liver." [3] Such a circumstance suggests that a closer analysis of the national statistics would be of interest.

In Table II. the recent movement of the death-rates is shown for each of the four main administrative divisions of the country. Broadly speaking the same trend is apparent in each—namely, a very distinct fall in mortality in 1928 followed by an increasing death-rate in the subsequent years. In each division the present position is still materially better than that of the pre-liver-therapy years, 1921–26, for the mortality of 1931–33 was, roughly, 20–25 per cent. below that in the earlier period. On the other hand, in each division the improvement of *1928* over 1921–26 was of the order of 30–40 per cent., so that the retrogression is comparatively uniform.

The chief interest in this analysis by administrative area lies in the fact that, apart from women in London, the large urban areas show just the same trend as the rural areas; the fall in 1928 and the rise in 1931–33 are equally apparent. It might be thought that in the large towns a wider use of a new method of treatment would have secured a greater improvement in the death-rate and have maintained the improvement. Of that there is no evidence. The recent rise in the national mortality is not, it seems, the result of a relative lack of application, or continued application, of the new therapy in the more sparsely populated districts of the country.

A further aspect of the trend of mortality is shown in Table III. and Figs. 2 and 3 where the movements of the rates in recent years are examined with regard to age. It is at once apparent that the slow retrogression of the rate at all ages since its low level of 1928 is mainly, though not entirely, the product of an increasing mortality at the more advanced years of age, 55 and upwards.

In nearly every age-group an abrupt decline in mortality was recorded in 1928, coinciding with the introduction of liver therapy. At ages over 55 years this decline, which interrupted a rising tendency in the rates, becomes progressively smaller with advancing age, and has in none of the age-groups been maintained in subsequent years. At ages 55–65 years the rate in 1931–33 is still below that of the pre-liver years for both sexes, but has risen appreciably since 1928. At ages 65–75 years the 1921–26 level has again been reached in 1931–33, and at ages 75 years and over it has been exceeded by as much as 50–60 per cent.

At the younger ages, under 55 years, the level of mortality remains substantially below that registered in 1921–26, 40–50 per cent. below, but even here a slight deterioration of the 1928 position can be discerned amongst females.

A corollary of these changes in the specific death-rates is a change in the age-distribution of deaths from pernicious anæmia.

In 1921–26 39 per cent. of the deaths of males and 45 per cent. of the deaths of females were at ages under 55; in 1931–33 the corresponding proportions were only 24 and 31 per cent. A similar displacement characterises the older ages. In 1921–26 the maximum death-rate lay for both sexes at 65–75 years. Its excess over the mortality in the previous decade of life, 55–65 years, was 47 per cent. for males and 33 per cent. for females. In 1931–33 its excess had risen to 100 per cent. for males and 77 per cent. for females. At the same time the death-rate at 75 years and upwards has risen from a position 40 per cent. below the maximum to one of very nearly equality.

In recent years, therefore, pernicious anæmia has become, as a cause of mortality, still more a disease of old age. At these older ages the curves of mortality show a rise between 1921–26 and 1927, perhaps a real increase in the disease, perhaps one due to more accurate diagnosis and certification. The introduction of liver therapy checked this upward tendency but has not prevented its subsequent revival.

In the seasonal distribution of the disease liver therapy has produced no material change (Table IV. and Fig. 4). With the extension of the use of the new therapeutic agent in 1928 the distribution of the deaths throughout the year was, as would be expected, appreciably altered; a larger proportion than normal fell in the first four months of the year and a smaller proportion than normal were registered in the latter period of the year. In 1930–31 (the latest available figures) the original seasonal distribution has reasserted itself and the bi-monthly proportions do not differ materially from those of 1921–25. The magnitude of the seasonal variation is also approximately equivalent in the two periods.

TABLE III

Death-rates per million from Pernicious Anæmia in England and Wales in different Age-groups from 1921–26 *to* 1933

MALES

Age in years—	0 –	25 –	35 –	45 –	55 –	65 –	75 +
Year.							
1921–26	4·9	14·3	39·7	106·8	226·0	331·1	196·4
1927 ..	4·1	12·7	32·1	83·0	236·3	369·7	230·2
1928 ..	4·9	12·1	16·7	53·4	126·0	269·2	187·4
1929 ..	3·8	8·7	20·3	50·4	140·9	298·3	269·3
1930 ..	3·6	8·8	25·5	58·6	173·6	295·4	244·9
1931 ..	3·4	9·1	17·5	48·1	163·6	310·9	301·0
1932 ..	5·1	9·5	16·6	60·1	174·8	368·3	338·8
1933 ..	5·3	5·6	23·5	60·4	158·6	317·0	321·9
The death-rates as percentages of the corresponding rates in 1921–26							
1921–26	100	100	100	100	100	100	100
1927 ..	84	89	81	78	105	112	117
1928 ..	100	85	42	50	56	81	95
1929–30	76	61	58	51	70	90	131
1931–33	94	56	48	53	73	100	163

FEMALES

Year.							
1921–26	7·8	29·6	69·4	129·9	252·8	336·9	201·8
1927 ..	7·0	25·8	60·1	132·1	242·0	353·4	224·2
1928 ..	6·3	15·6	38·0	71·9	177·8	280·5	186·9
1929 ..	5·4	14·6	36·0	76·3	169·6	300·9	224·2
1930 ..	3·6	20·2	39·4	79·9	182·1	300·1	283·9
1931 ..	4·7	17·3	38·5	85·7	198·3	327·6	231·4
1932 ..	4·5	17·4	41·5	98·0	216·6	378·5	334·8
1933 ..	3·9	20·2	40·5	81·9	191·3	366·6	325·7
The death-rates as percentages of the corresponding rates in 1921–26							
1921–26	100	100	100	100	100	100	100
1927 ..	90	87	87	102	96	105	111
1928 ..	81	53	55	55	70	83	93
1929–30	58	59	54	60	70	89	126
1931–33	56	62	58	68	80	106	147

TABLE IV

England and Wales: the Seasonal Distribution of Deaths from Pernicious Anæmia

Months.	Average number of deaths per day.			Average number in each two-monthly period as percentage of average number for whole year.		
	1921–25	1928	1930–31	1921–25	1928	1930–31
Jan. and Feb. ..	7·01	6·02	6·30	102	119	105
March and April	7·33	5·64	6·20	107	111	104
May and June ..	6·55	4·84	5·81	95	96	97
July and Aug. ..	6·12	4·50	5·52	89	89	92
Sept. and Oct. ..	6·83	4·77	5·97	100	94	100
Nov. and Dec...	7·36	4·64	6·19	107	92	103
Whole year ..	6·86	5·06	5·99	100	100	100

[3] Preface to Ministry of Health Report on Public Health and Medical Subjects, 1934, No. 75

DISCUSSION

In an article [4] on the prognosis of pernicious anæmia Dr. L. J. Witts stated that :—

"The prognosis . . . is chiefly determined by the care and skill of the physician and the coöperation of the patient. The treatment of the disease is simple, but the penalty of inadequate treatment is severe. It is little advantage to a patient to be relieved of his anæmia only to develop paralysis later, but this has been the fate of many during the last ten years. Avoidance of this disaster does not require any special skill, but it does entail strict adherence to the rule that sufficient effective substance must be given to maintain the blood count constantly at a normal level. Intelligent patients often learn to estimate their own hæmoglobin and look after themselves efficiently. The majority need to remain under medical supervision so that their hæmoglobin can be tested at least once every six weeks, and so that the onset of symptoms suggestive of subacute combined degeneration, such as paræsthesiæ or rheumatic pains in the limbs, can at once be countered by massive dosage of effective substance. If these precautions are taken, a patient with pernicious anæmia probably has the same expectation of life and physical well-being as his fellow men. . . . To maintain health treatment must be continued indefinitely and with the utmost regularity."

The course of the death-rates at ages in the past few years shows that physical well-being and health are not being so maintained in many cases. The sudden fall in the death-rate in 1928 at nearly every age is satisfactory evidence of the efficacy of the new method of therapy, especially for patients under the age of 55. The subsequent rise rather suggests that *as applied* the method in many cases may prolong life but not prevent death eventually. According to Witts' conclusions a preventable mortality is not being prevented. Whether his conclusion is fully justified by the statistics of mortality is a little doubtful. It is clear from the figures in Table III. that at ages 35 and upwards the degree of reduction that took place in the death-rate in 1928 declined substantially with age. Unless it be presumed that liver therapy was more widely and more efficiently applied at the younger ages the inference to be drawn is that the older the age of the patient the less likelihood is there of his being restored to "the same expectation of life and physical well-being as his fellow men." In any study of the success attending liver therapy it is, therefore, essential to take account of this important factor, the age of the patient. Even, however, at the younger ages where, judging by the mortality statistics, liver therapy has been most strikingly successful, it has, so far, been unable to reduce the mortality to a lower point than some 50 per cent. of the level in 1921–26, and it appears possible that it will be unable to hold it at that level. How are we to explain the remaining half of the mortality-rate at these younger ages—that it is a needless waste of life for which lack of treatment or inadequate treatment are responsible, or that even with the best and most regular treatment the physician still cannot in many cases hope to avoid a fatal issue? Only with a large number of case-histories spread over a long period can we hope to answer that question. At present the trend of the death-rates after their striking improvement in 1928 is disappointing.

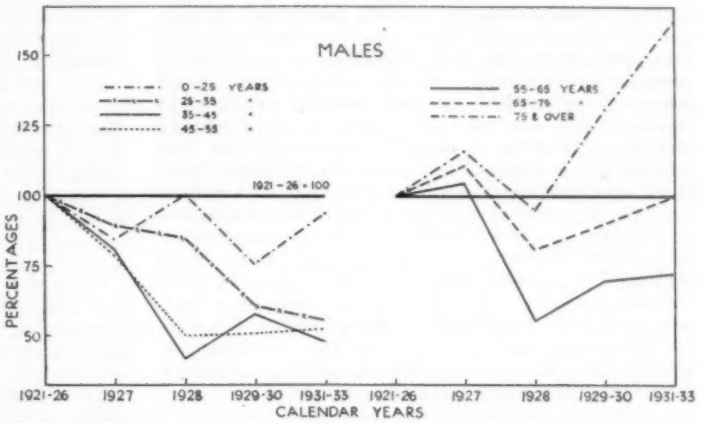


FIG. 2.—England and Wales. Death-rates from pernicious anæmia at ages, 1927 to 1933, each rate being expressed as a percentage of the corresponding rate in 1921–26.

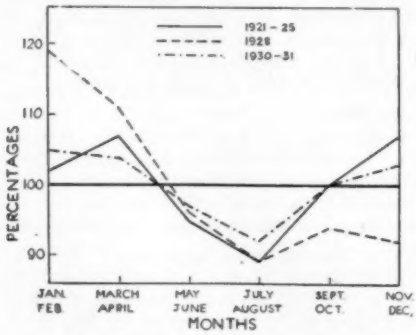


FIG. 4.—England and Wales. The average deaths per day from pernicious anæmia in certain months of the year expressed as a percentage of the average deaths per day throughout the year. Both sexes and all ages combined.

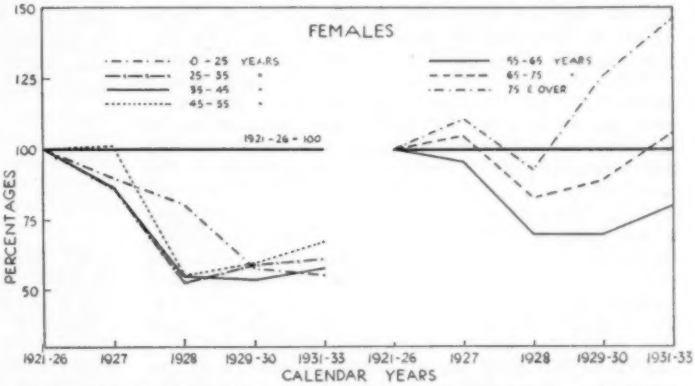


FIG. 3.—England and Wales. Death-rates from pernicious anæmia at ages, 1927 to 1933, each rate being expressed as a percentage of the corresponding rate in 1921–26.

SUMMARY

The sudden decline in the death-rate from pernicious anæmia in England and Wales that became apparent in 1928 is testimony to the efficacy of liver therapy.

[4] THE LANCET, 1934, i., 407.

Since then the death-rates of both sexes (standardised for age) have tended to rise, slowly but progressively, and this deterioration is apparent in each of the four main administrative divisions of the country, London, county boroughs, other urban districts, and rural districts. Comparison of the death-rates at ages shows that the increase in mortality since 1928 is largely a product of an upward movement at ages over 55 years, and at ages over 75 years the death-rate now appreciably exceeds the level in the years prior to liver therapy. At the younger ages, 25–55 years, where in 1928 the most striking reduction in the death-rate was recorded, there is a slight upward movement and a suggestion, therefore, that the original improvement is not being maintained. With an extension of liver therapy, and more refined methods of application, it would have been reasonable to hope for a still further decline in the death-rates, below their 1928 level, but such a hope has not been fulfilled. If, as Sir George Newman writes, "a fatal termination which heretofore eventuated in a year or so may now by the adequate use of modern methods be indefinitely postponed in the great majority of cases," then the present aspect of the mortality-rates is not one which can give satisfaction.

I am much indebted to the Registrar-General for the provision of the deaths and estimates of the populations at ages in the administrative areas in 1931–33.

MEDICINE AND THE LAW

A Question of Professional Secrecy

AT an inquest at Hull on Dec. 21st, on the death of a woman, her medical attendant was questioned as to an alleged breach of professional confidence. The deceased had been worried about her pregnancy and had confessed to him that she had been having relations with a man whom she named who was not her husband. She had threatened to commit suicide. After her death the doctor communicated these facts to her husband when the latter came to him for the certificate of the cause of death. Asked at the inquest how he reconciled this disclosure with the traditional oath of professional secrecy, the doctor explained that, if there was a possibility that the deceased had taken poison or used an instrument for the illegal termination of her pregnancy, he could not sign a death certificate. Sir Bernard Spilsbury, who gave evidence as to the cause of death, agreed with the view taken by the doctor. The talk of suicide and the sudden collapse, in his opinion, made it important that the doctor should be satisfied whether there had been any poisoning; for this purpose he had to explain to the husband why he was inquiring about certain bottles. Sir Bernard, in answer to further questions, said that in similar circumstances he would himself have had no hesitation in revealing the information to the husband. The coroner, whose doubts as to the professional propriety of the disclosure were perhaps hardly relevant to the limited purposes of the inquest, ended by expressing himself satisfied with the doctor's treatment of the case, though he thought that the wife's dread of the possibility of another confinement was such that the doctor might well have been content to mention this fact only to the husband without going on to reveal the statement of her relations with another man.

Although considerable time was devoted at the inquest (both on the opening day and subsequently, after an adjournment, on a second day) to this extraneous topic of professional propriety, it does not seem to have been appreciated that the duty of secrecy is primarily a duty to the patient. If the doctor, balancing one propriety against another, decided that it was right to make the disclosure, it is not clear that the husband has the same ground for protesting as the patient would have had; nor is it apparent why the recipient of the divulged confidence should have allowed or encouraged the further publicity which the inquest was able to give to the disclosure. And it may be worth while to add that, whereas a medical practitioner does not feel himself released from his confidential position by the death of the patient, the fact of death may well be a material element in deciding an ethical question about the propriety of disclosure.

Inadequate Mortuaries

Complaint of the inadequate and sometimes even disgusting accommodation at mortuaries outside the London district is by no means rare. Decency and humanity require that the place where relatives are brought for the purpose of identifying a dead body should not offend by its unsuitability. Public health standards demand that local authorities should make proper provision and that post-mortem examinations should be conducted in circumstances of reasonable convenience. On Dec. 22nd the Doncaster district coroner, Mr. W. H. Carlile, condemned the mortuary in Thorne old workhouse. A few days later Sir Samuel Brighouse, the coroner for South-West Lancashire, described the Aintree mortuary as a dirty, disreputable outhouse. The police surgeon described the place as little better than a cart-shed; there was no table and no supply of warm water; the little bowl was filthy and not fit for anyone to wash his hands in; the walls were dirty. His box of instruments, he said, had to be left on the floor or put down on the ground outside. The mortuary slab was the kind of slab which was in common use 50 years ago. The coroner gave orders that the Aintree mortuary should be closed and not used even as a resting-place for bodies. He observed that the Chief Constable of Lancashire had objected to his action in closing the mortuaries at Aintree and Maghull, but he himself was not disposed to accept this officer's dictation in such a matter.

IRELAND

(FROM OUR OWN CORRESPONDENT)

MILK: A FRESH START

AN important decision was announced by the Government of the Irish Free State when the Milk Bill entered on its Committee stage a few days before Christmas. An amendment was moved by Dr. R. J. Rowlette to make it compulsory for producers and vendors of milk to obtain licences for the purpose. Dr. Ward (Parliamentary Secretary to the Minister for Local Government and Public Health), who was in charge of the Bill, then stated that the principles of the amendment had been considered during the preparation of the Bill but had been rejected in deference to the views of the Department of Agriculture. Since the second reading strong representations in favour of licensing had been made to him, and there was a volume of opinion in that direction. If he were to adopt the amendment, however, there would remain many implications and complications to be dealt with. If the principle were adopted he

would advise the House to discharge the measure, and he would introduce without delay a new Bill which would deal in a comprehensive way with the whole question of the milk-supply—production, supervision, and sale. On this understanding the amendment was, by leave, withdrawn, and the parliamentary secretary was given leave to withdraw the Bill. On the following day he moved the first reading of a Milk and Dairies Bill, and the second reading was fixed for Feb. 13th. The text of the Bill is to be circulated during the recess.

NATIONAL MATERNITY HOSPITAL

The first section of the new buildings of the National Maternity Hospital, Dublin, was blessed and opened by the Bishop of Thasos on Dec. 17th. Up to the present this institution, now over 50 years in existence, has been housed in two unsuitable old houses in Halles-street, but a completely new modern hospital is now in course of construction out of funds obtained from the hospital sweepstakes. It has a frontage on Merrion-square as well as one on Halles-street. The part finished contains a commodious and comfortable nurses' home as well as a large section of the hospital proper. The theatre and wards are constructed and equipped in the most modern way. All power—for heating, cooking, lighting, and lifts—is got from electricity drawn from the Shannon, with a reserve source of supply in the basement of the hospital. The new hospital should increase the prestige of the already famous Dublin school of obstetrics.

BUCHAREST

(FROM OUR OWN CORRESPONDENT)

COMPULSORY INSURANCE

UNDER a new law health and pensions insurance has become compulsory in Rumania for all employees, without regard to age, sex, or nationality, whose wages do not exceed a fixed sum, varying in different localities. Provision is also made in the Act for the insurance of free-lance workers. Insured persons are entitled to medical attendance, drugs and dressings, trusses, crutches, and so forth; benefit in cases of sickness, accident, maternity, or death; and disablement allowances or pensions. A wife living with her husband, children under the age of 16, and disabled parents are also eligible for medical treatment. Payment is made for hospital attendance for a period of 26 weeks, which may be extended to a maximum period of one year. If financial reserves permit insured persons will also be sent to spas and health resorts for convalescence and receive dental treatment. Dependents, however, are entitled only to drugs, and to money allowances for a maximum period of 26 weeks. An insured woman is entitled to 12 weeks' maternity benefit and six weeks' nursing allowance. The wife of an insured person is entitled only to free medical attendance and drugs in childbirth, though she may also get half of the six weeks' allowance which would be due to an insured person. Pensions are granted to insured persons who because of old age, accident, or illness are unable to earn a third of their usual wages. These are also entitled to free medical attendance and drugs, and when they die their relatives receive a funeral allowance. The widow of a pensioner, if she is disabled and poor, receives half of his pension, and children under 16 get a third of the pension of their parent; but the total amount received by a widow and her children must not exceed the pension allowed to the father.

Half the contribution to the insurance scheme has to be paid by the employer and half by the employee. The weekly charges are fixed at a general meeting of the central organisation and have to be sanctioned by the council of ministers. To sickness benefit the State contributes about £30,000, but further grants will be made next year.

There are three grades of medical staff in the social insurance scheme: (1) physicians at central institutions, physicians-in-chief and medical inspectors of the sick clubs; (2) the medical superintendents of hospitals and sanatoriums and the heads of the various out-patient and other departments; (3) assistant physicians and surgeons. In epidemics other doctors may be called in for short periods. In larger centres at the request of the sick clubs a free choice of medical attendant is offered.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Sur. Lt.-Comdrs. H. H. Fisher to *Drake* for R.N. Hospl., Plymouth; C. R. Boland to *Victory* for R.N.B.; D. H. Kernohan to *Ganges* for Shotley Sick Quarters; and J. H. Nicolson to *Hastings*.

Surg. Lt.-Comdr. (D).—M. F. Hopson placed on the Retd. List at own request with rank of Surg. Comdr. (D).

Surg. Lts. A. J. Glazebrook to *Excellent*; G. D. Webb to *Victory* for Haslar Hospl.; J. W. Rhys and W. A. S. Grant to *Pembroke* for R.N.B.; E. D. Caldwell, R. F. Stenhouse, and E. James to *Drake* for R.N.B.; P. K. Fraser to *Victory* for R.N.B. and to *Hood*; R. M. Kirkwood to *Victory* for R.N.B.; and C. Ommanney-Davis to *Drake* for R.N. Hospl., Plymouth.

ROYAL NAVAL VOLUNTEER RESERVE

Proby. Surg. Sub-Lt. R. V. Jones to *Rodney*.

R. T. May and P. S. Luffman entered as Proby. Surg. Sub-Lts. and attached to List 2 of the London Div.

ARMY MEDICAL SERVICES

Col. D. Ahern, D.S.O., late R.A.M.C., is placed on half pay under the provisions of Art. 500, Royal Warrant for Pay and Promotion, 1931.

The undermentioned Lt.-Col. to be Col.: A. D. Fraser, D.S.O., M.C., from R.A.M.C.

ROYAL ARMY MEDICAL CORPS

The undermentioned Majs. to be Lt.-Cols.:—

G. F. Allison, M.C., and A. A. M. Davies

Short Serv. Commissions.—Lt. (on prob.) J. M. Carnow is restd. to the estabt.

TERRITORIAL ARMY

Capt. P. Hayes to be Maj.

R. A. Kennedy to be Capt.

A. P. McEldowney (late Cadet Corpl., Aldenham Sch. Contgt., Jun. Div., O.T.C.) to be Lt.

A. M. Robertson to be Lt.

Supernumerary for service with the O.T.C.—L. C. Bousfield (late Offr. Cadet, Med. Unit, Univ. of Lond. Contgt., Sen. Div., O.T.C.) to be Lt. for duty with Med. Unit, Univ. of Lond. Contgt., Sen. Div., O.T.C.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. G. Morgan, from Active List, to be Capt.

ROYAL AIR FORCE

Flying Offr. J. A. Crockett resigns his short service commission.

INDIAN MEDICAL SERVICE

The promotion to the rank of Capt. of the undermentioned officers is confirmed: J. Quigley, R. A. Haythornthwaite, K. H. A. Gross, M.C., A. K. M. Khan, E. A. R. Ardeshir, B. Temple-Raston, G. F. Condon, D. McCarthy, and B. A. Porritt.

The prob. appts. of the undermentioned officers are confirmed: G. B. Thomas, H. A. Ledgard, W. W. Laughland, T. F. O'Donnell, J. White, F. W. Whiteman, F. C. Leach, and R. D. Scriven.

G. P. Charlewood to be Lt. (on prob.).

DEATHS IN THE SERVICES

Surgeon Rear-Admiral ERNEST JAMES FINCH, who died on Dec. 22nd, was the son of Chief Inspector of Machinery James Jackson Finch, R.N., and received his medical education at St. Mary's Hospital, obtaining the double English diploma in 1891. He later graduated in medicine at Brussels. He joined the naval medical service and was present at naval and military operations on the Niger coast almost at once. He took part in the naval expedition on the Benin River in 1894 and received the African medal with the Benin River clasp. He had reached the rank of Fleet-Surgeon when, at the outbreak of war, he was appointed to the staff of the Royal Naval Division, served with the R.N. Brigade at the defence of Antwerp, and later was appointed to the R.N. Division in the Gallipoli expedition as commander of the 3rd Field Ambulance. He later became A.D.M.S. of the Division and in 1916 was mentioned in dispatches and appointed C.M.G. He next served with the R.N. Division in France and was present at the Battle of Beaumont-Hamel. After the war he resumed his naval medical duties and was appointed M.O. to the Portsmouth Division of the R.M.L.I. and finally had medical charge of the R.N. barracks at Portsmouth, a post which he held until his retirement in 1923 with the rank of Surgeon Rear-Admiral. He married in 1900 Dorothy, daughter of Mr. Alfred Barrett, and leaves one daughter.

The death is announced on Dec. 26th at Dedham, Essex, of Col. RICHARD HUGH PENTON, D.S.O. He was the son of the late Maj.-Gen. John Penton of Lostwithiel, Cornwall. He was born in April, 1863, and educated at Norwich Grammar School, qualifying M.R.C.S. Eng. in 1886. He entered the army in February, 1887, became Surg. Capt. in 1897, and Major R.A.M.C. in November, 1898. He was present at the Battle of Atbara and received special promotion for service at the battle of Khartoum, 1898. He was promoted Lt.-Col. in July, 1906, and Col., Army Medical Services, in March, 1915, and retired in 1919. He served with the Dongola Expedition 1896, Nile Expedition 1898–99, and was attached to the Egyptian Army 1892–95, and received Egyptian decorations. He was appointed medical inspector of recruits, Northern Command, in 1906, and senior medical officer, Poona, in 1909. He married in 1902 Kathleen Rosa, daughter of the late Lt.-Col. R. S. Green of Dedham, Essex. He was created D.S.O. in 1896.

PUBLIC HEALTH

Unemployment Assistance

THE NEW ASSESSMENT OF NEEDS

UNDER the regulations of the Unemployment Assistance Act, 1934, which come into force early this year, the assessment of the needs of an applicant shall include the needs of any members of the household who are dependent on or ordinarily supported by him. The scale is as follows :—

PART I.—*Household of Two or more Persons*

		Weekly.
(*a*) For the householder and the householder's wife or husband		24*s.*
(*b*) For the householder (where rate (*a*) is not applicable)	male	16*s.*
	female	14*s.*
(*c*) For each other member of the household aged 21 years or over—		
For the first such member	male	10*s.*
	female	8*s.*
For each subsequent member	male	8*s.*
	female	7*s.*
Aged 18 to 21 years	male	8*s.*
	female	7*s.*
Aged 14 to 18 years		6*s.*
Aged 11 to 14 years		4*s.* 6*d.*
Aged 8 to 11 years		4*s.*
Aged 5 to 8 years		3*s.* 6*d.*
Under 5 years		3*s.*

(*d*) Where the household consists of only one child in addition to not more than two adults, the amount allowed in respect of that child shall be not less than 4*s.*

(*e*) Where in any household there are more than five members, the total for that household shall be reduced by 1*s.* in respect of each member in excess of five.

PART II.—*Applicant not a Member of a Household*

		Weekly.
(*a*) Aged 18 years or over	male	15*s.*
	female	14*s.*
(*b*) Under 18 years	male	13*s.*
	female	12*s.*

COMMENT ON THIS SCALE

The Children's Minimum Committee, of which Miss Eleanor Rathbone, M.P., is chairman, has issued a memorandum welcoming the scale on which the Unemployment Assistance Board proposes to base its grants in respect of dependent children as a considerable advance on the 2*s.* per child allowed under unemployment benefit and on the practice of most public assistance committees. It is pointed out, however, that for families with two or more children the proposed scale will not even now permit an expenditure sufficient to satisfy the standards laid down for food by the B.M.A. committee on nutrition, and for clothing and other necessaries by the Merseyside and other sociological surveys. The memorandum compares in Table A the proposed children's allowances at different ages with the estimated cost of food on the B.M.A. standard plus the bare minimum of 1*s.* 2½*d.* per child for clothing, cleaning, and light allowed in the Merseyside survey.

TABLE A.—*Children's Allowances*

Age of child (years).	Unemployment Assistance.	B.M.A. food plus 1*s.* 2½*d.* for clothing, cleaning, and light.	Deficit.
2	3*s.*	4*s.* 3½*d.*	1*s.* 3½*d.*
4	3*s.*	4*s.* 7½*d.*	1*s.* 7½*d.*
6	3*s.* 6*d.*	4*s.* 9½*d.*	1*s.* 3½*d.*
8	4*s.*	5*s.* 4½*d.*	1*s.* 4½*d.*
10	4*s.*	5*s.* 11½*d.*	1*s.* 11½*d.*
11	4*s.* 6*d.*	6*s.* 6½*d.*	2*s.* 0½*d.*

The memorandum goes on to compare in Table B the scale for families of various composition with estimated minimum needs, taking the B.M.A. scale for food and the Merseyside estimates for clothing, cleaning, light, and fuel.

TABLE B.—*Family Allowances*

Scale.	B.M.A. food plus Merseyside extras.	Unemployment Assistance.	Rent allowance.	Unemployment insurance.
Man and wife	24*s.* 2*d.*	24*s.*	7*s.* 6*d.*	26*s.*
One child				
2 years	27*s.* 9*d.*	28*s.*	7*s.* 6*d.*	28*s.*
Two children				
4 and 9 years	34*s.* 5*d.*	31*s.*	7*s.* 9*d.*	30*s.*
Three children				
3, 7, 10 years	40*s.* 7*d.*	34*s.* 6*d.*	8*s.* 7*d.*	32*s.*
Five children				
1, 4, 7, 11, 13 years	51*s.* 4*d.*	40*s.* 6*d.*	10*s.* 1*d.*	36*s.*

Both the B.M.A. and the Unemployment Assistance scales assume that the "basic rents" (given in col. 4) allowed by the Board are the actual rents.

The margin between the minimum needs scale and unemployment assistance widens in Table B from 3*s.* 2*d.* where there are two children to 8*s.* 3*d.* where there are five. The memorandum points out

that the additional cost of a more generous assessment in the case of the larger families would not be great, since although a considerable proportion of families have at some time or other more than three dependent children the number of such families at any one time is relatively small. In the 1921 census only 6·7 per cent. of adult males had more than three children under 14 years of age, and it is probable that with the fall in the birth-rate the percentage to-day is even smaller. It is generally admitted that with an increase in the size of the household there is a saving in the overhead costs per head, and if the allowances were in themselves adequate this might be reasonable, but it is indefensible, the committee suggests, when the basic rates per child already fall below the minimum of subsistence. It must be remembered that under unemployment assistance it will no longer be possible, as it used to be under unemployment benefit, to apply to the poor-law for additional relief.

EXPERIENCE OF THE SCHOOL MEDICAL SERVICE

The consensus of opinion among school doctors, who have first-hand knowledge of the facts, is that malnutrition caused by under-feeding was comparatively rare in 1933, and that on the whole the physique of the children was as good as it has ever been and immensely better than 10 or 20 years ago. Dr. C. K. Bowes (Bedford) remarks: "Malnutrition is found at all times and in all places and may be due to many other causes than inadequate amount or even improper quality of food, for unhealthy habits of life of all kinds may prevent the proper assimilation of food and leads to consequent malnutrition." The contrast between the evidence that under-feeding is inevitable, and the observed fact that signs of it are seldom found, is so striking that it may well be thought to indicate some error in one set of estimates or alternatively that there are undiscovered factors which explain the apparent discrepancy. The substantial accuracy of the figures on both sides can, however, scarcely be contested though admittedly the scale of needs omits reference to several little additions to the family income. An unemployed man can rarely earn any substantial amount without deduction from his unemployment benefit or public assistance allowance, but he or his wife may receive a little help either as pay for services rendered or as free gifts in money or kind; he may have the produce of a garden or allotment; the mother may be one of those superhumanly good housewives who can make sixpence do the work of a shilling.

The Children's Minimum Committee contends that the evidence that the children's health has not deteriorated is mainly based on a "very inadequate system of school medical inspection." The system does not extend to children just above school age "who by general report appear to be suffering most," and even if the assertion be true, "the fact that the children's health is not worse than it was in previous years does not prove that it is satisfactory." Wherever comparisons have been made between the health of working-class children and those belonging to the middle and upper classes, "the superiority of the latter in height, weight, and physique has been striking." The committee adds, what can hardly be gainsaid, that the health of the children of the poor is apt to be maintained at the expense of their mothers "who go short to feed their families." But the implication that cases of malnutrition are overlooked because the inspections are inadequate is refuted by the fact that the search for cases is thorough and the findings at routine inspections are confirmed by a number of special investigations. For example, a London study gave 93·5 per cent. well-nourished to 6·5 per cent. subnormal children, which is fairly close to the figures found at routine inspections in the whole country and to the average of the findings in many big towns; in Warrington, for example, the figures were 92·9 and 7·1. The difference in build and stature between the children of the working class and those from more fortunate strata is real, but it is not simply due to differences in food, but to many factors, some of them no doubt the same as those which have made the physique of the children of all classes so demonstrably superior to what it was ten years ago.

The possibility that under-feeding may exist without producing obvious symptoms is mentioned in school reports from some of the county boroughs, where in general the view of the medical officers is somewhat less favourable than in the counties. Dr. S. Rowland (Northampton), who finds no actual deterioration, remarks on the difficulty of laying down standards and admits that the degree of resistance to infection cannot be satisfactorily measured by any formula so far devised. Dr. F. T. H. Wood (Bootle) also, after stating that there is no deterioration in the children of his area, admits the growth of evidence to prove that certain articles of diet are essential to the growth of sound tissues, and that without them the body gives way to disease processes "as a jerry-built house fails to withstand the weather." But none of the reports brings forward evidence that this power of resistance has actually decreased. The discrepancy between the malnutrition expected and the amount found manifest is then hardly to be explained by erroneous estimates. What does go some way to reconcile the difference is the fact that the good work done in the schools extends beyond the children actually treated and does something to relieve the strain on the family budget—e.g., by providing residential treatment. There is however some new evidence from Brecon that poverty has definite relation to nutrition in a special research by Dr. W. F. W. Betenson comparing nutritional quotients in two county areas: Brynmawr, a depressed district, and Ystradgynlais, where unemployment has not been serious. His figures are:—

	Brynmawr.	Ystradgynlais.
	Per cent.	
Weight for height—		
Above normal	48·8 ..	64·8
Normal	11·7 ..	8·3
Below normal	39·5 ..	26·9
Subdividing the last group he finds:—		
Less than 7% below normal	25·0 ..	19·2
7% to 10% ,, ,,	6·8 ..	3·4
10% or more ,, ,,	7·7 ..	4·3

The difference in the first of these sub-groups may not be important, but in the last it is serious—nearly double the number in the poorer area of children in grave need of treatment. Dr. Betenson thinks the quantity of food is rarely at fault, but rather that it is inadequate in the correct proportion of fats, proteins, and carbohydrates, and in vitamin content. Probably too in these despondent homes the food is not so wisely chosen and prepared.

On the general principle of taking no risks, school doctors are at one with the committee. Dr. A. J. Laird (Cambridge) writes: "Even to the expert, malnutrition does not show definite signs until it has been exerting its influence for some time. It is

most undesirable that children should remain untreated until they show such signs, for by that time serious damage may have been done." Dr. Dunstan Brewer (Swindon) is still more emphatic. The first work of the school medical department, he says, is to see to the feeding of school-children. "Now we shall be told straight away that this is not our business, that our work is to remedy defects . . . but would you ask a joiner to make you a cabinet and tell him that the material of which is to be made is none of his concern?"

Mental Defect in London

Vigorous administration of the Mental Deficiency Acts is more economical than the policy of inaction which prevails in most parts of the country. The multiplicity of administrative methods in mental deficiency is well illustrated in a report [1] to the Board of Control on executive work in the London area during the year 1933. Over 16,000 defectives now living are subject to be dealt with in the area which has a total population of over four million. There are in addition 4000 children attending L.C.C. special schools. Ascertainment has proceeded at a steady rate for some twenty years. Recently the number ascertained each year has been swollen by a systematic combing out of cases hitherto dealt with under the Poor Law or Lunacy Acts. Unfortunately this work was suspended in June, 1933, on grounds of economy. Nevertheless the figures show that about 0·5 per cent. of the total population are known to be defective according to the standards of the Mental Deficiency or the Education Acts. The limit of ascertainment may not yet have been reached, but the figure is within measurable distance of the 0·8 per cent. estimate of the Wood report.

The problem of dealing with these 16,000 certified defectives requires much labour and ingenuity for its solution. In the first place there are about 6000 beds in institutions occupied at the cost of rather more than £1 weekly; only a small proportion of these beds (about 400) are provided by contract with privately run homes. Institutional life is not spent in unproductive idleness, and the general principle holds good that the patients are taught useful trades with a view, in certain cases, to discharge as competent citizens. Actually, at the end of 1933, 374 cases were on licence on these terms. At Darenth Training Colony the average mental age is 7 to 8 years, and very few patients could fulfil a useful function in the general community, but the value of articles made in the workshops exceeds £50,000 yearly. With regard to about 3000 ascertained cases it has been unnecessary to take any official action. More than 3000 of the remaining cases are under statutory supervision; a few others are under guardianship or dealt with through the public assistance committee. Some cases originally classed as mentally defective have been removed to mental hospitals under the Lunacy Act. Several years will no doubt pass before the correct adjustment has been found between the number of cases suitable to be dealt with as lunatics and the number who are best treated as defectives. Until the existing confusion is cleared up there remains a loss of efficiency in the working of the medical services, since the insane stand in need of therapy while the defective chiefly require education and training.

About half the cases under statutory supervision are usefully employed, the most favoured occupation being that of factory hand. Supervision is by officers in the mental hospitals department, and takes the form of systematic visitation. Defectives known to the local authorities and not subject to the Acts are visited. The L.C.C. also undertakes to help in finding work for children on leaving the special schools. Occupational centres are provided where handwork and discipline are taught to children under statutory supervision or on licence from institutions, but the classes are not as well attended as might be hoped. Probably too few parents realise the advantages of the improved behaviour which results, even in low-grade cases, from regular attendance at these centres.

During the year an investigation was made at the request of the Departmental Committee on Sterilisation. Nearly 400 families in which at least one parent was mentally defective were inquired into and the mentality of the children recorded, the results being published in that committee's report. Nearly half the children of the mentally defective parents were found to be mentally retarded or defective. A striking fact which emerged from the figures was that the mean number of surviving children per family was only 2·3. It is beginning to be realised that a vigorous administration of the Mental Deficiency Acts is in the end more economical than the policy of inaction which is still prevalent in some of the provinces.

[1] Sixteenth report to the Board of Control. Vol. VI., Chap. III of the annual report of the L.C.C. for 1933. London: P. S. King and Son. Pp. 67. 1s.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 22ND, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 3382; diphtheria, 2042; enteric fever, 14; acute pneumonia (primary or influenzal), 773; puerperal fever, 32; puerperal pyrexia, 80; cerebro-spinal fever, 16; acute poliomyelitis, 9; acute polio-encephalitis, 2; encephalitis lethargica, 3; dysentery, 26; ophthalmia neonatorum, 75. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 28th–29th was as follows: Small-pox, 0 under treatment, 0 under observation; scarlet fever, 1641; diphtheria, 2293; measles, 173; whooping-cough, 266; puerperal fever, 18 mothers (plus 9 babies); encephalitis lethargica, 267; poliomyelitis, 9; "other diseases," 269. At St. Margaret's Hospital there were 18 babies (plus 9 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 1 (1) from enteric fever, 4 (0) from measles, 4 (0) from scarlet fever, 11 (1) from whooping-cough, 66 (9) from diphtheria, 28 (11) from diarrhœa and enteritis under two years, and 40 (5) from influenza. The figures in parentheses are those for London itself.

Influenza is still on the wane, the total deaths for the last few weeks, working backwards, being 40, 46, 56, 64, 61. This week the deaths attributed to influenza were distributed over 28 great towns, Birmingham reporting 5, no other great town more than 2. There were 6 deaths from diphtheria at Birmingham, 4 each at Bradford, Leeds, and Liverpool, 3 at Sheffield.

The number of stillbirths notified during the week was 281 (corresponding to a rate of 44 per 1000 total births), including 44 in London.

LEEDS GENERAL INFIRMARY.—Lord Moynihan spoke recently at a public meeting in Leeds in support of an appeal for £250,000 for this hospital. He urged the necessity for coöperation between the voluntary and municipal hospitals. He considered that a system of unity rather than uniformity would be the wish of most people and that it would make available for all the highest skill and the most compassionate care.

CORRESPONDENCE

PROGNOSIS IN PUERPERAL SEPSIS

To the Editor of THE LANCET

SIR,—In his article on p. 1459 of your last issue Mr. Wrigley makes the suggestion, which is I admit frequently put forward in text-books, that infection in puerperal sepsis spreads to the peritoneum by the tubes. This explanation, although generally accepted, is not confirmed by our findings here. Examination of our post-mortem records for the past three years shows that out of 50 deaths from hæmolytic streptococcus infection 39 have shown generalised peritonitis, while 3 others have shown an early pelvic peritonitis which had not become generalised up to the time of death. In these 42 cases of peritonitis the tubes were examined as a routine, both macroscopically and microscopically, and only 2 showed macroscopic pus in the tubes, while 5 others showed microscopically an early salpingitis, usually in one tube only, consisting simply of a polymorphonuclear infiltration of the submucosa. The remaining 35 cases showed healthy tubes, except for inevitable inflammation of the peritoneal surface.

As a result of these findings I have come to regard spread of infection through the tubes as an uncommon occurrence. On the other hand, sections of the uterus show that the essential lesion in these cases is a septic thrombophlebitis in the small vessels of the uterine wall, especially in the region of the placental site. By suitable staining methods it is often possible to demonstrate streptococci in the vessels of the uterus within one or two millimetres of the peritoneal surface, and it seems probable that a direct spread of the infection through the uterine wall to the peritoneum is by far the most common cause of puerperal peritonitis.

There is one other point in Mr. Wrigley's article which seems to me a little misleading. After saying that the finding of the hæmolytic streptococcus in the blood stream is of grave significance, he adds: "It seems that a less gloomy prognosis can be offered if the organism is found only on anaerobic culture." I fear that some confusion may have crept in here between the strictly anaerobic streptococci, which are *not* hæmolytic, and the hæmolytic streptococcus isolated under anaerobic conditions as we have been advocating in this laboratory for the past year. If it is the anaerobic streptococcus to which Mr. Wrigley refers, the prognosis is certainly less gloomy; but it must be remembered that we are then dealing with a completely different organism from the hæmolytic streptococcus, giving rise to a disease with a different clinical picture, with a marked tendency to thrombophlebitis especially in the iliac veins and vena cava, septic infarction of the lungs and possibly of the spleen and kidneys, and practically never a general peritonitis. If on the other hand it is the hæmolytic streptococcus to which he refers, the prognosis is the same whether the organism is isolated under aerobic or anaerobic conditions.

I am, Sir, yours faithfully,

R. M. FRY.

Bernhard Baron Memorial Research Laboratories, Queen Charlotte's Hospital, W., Dec. 31st, 1934.

SOME RECENT ADVANCES IN CARDIOLOGY

To the Editor of THE LANCET

SIR,—Dr. Crighton Bramwell's interesting address published in your last issue rouses me to point out that probably the greatest advance in that subject, not only in this but in other countries—and possibly the greatest since the time of Harvey—has been the demonstration, not once but repeatedly, of the experimental production of carditis not only from active rheumatic lesions but from streptococci obtained from inflamed tonsils. This advance is the basis of the prevention of heart disease which in the last 20 years has gradually impressed its importance, not perhaps so much upon the British mentality, as upon the medical world in general. The recognition that the preventive study of heart disease in childhood is one of the master-keys of so-called "cardiology" is surely almost as valuable as the conception of a cardiac X ray, and almost as worthy of notice.

I am, Sir, yours faithfully,

F. JOHN POYNTON.

Harley House, Upper Harley-street, W., Dec. 28th, 1934.

LONDON UNIVERSITY AND ITS MEDICAL SCHOOLS

To the Editor of THE LANCET

SIR,—In your excellent leading article of Dec. 1st last you comment upon my suggestion that the examinations for the first and second M.B. should be so altered as to adapt them to afford graduation with the second M.B. The faculty in which this degree should be placed seems to me of secondary importance. London, unlike the older universities, has particularised its degrees, and it would not be possible, as Dr. Norris proposes in your issue of the 22nd, to give the "B.A. (Lond.) degree" upon passing the second M.B., B.S. Perhaps, as you yourself suggest, a "B.Sc." would be the most appropriate award, but the faculty of science is in this matter of new degrees one of the most "sticky" in the University; it refused, for instance, to accept the "B. Pharm." which ultimately was assigned to the faculty of medicine and has been a very promising innovation.

Your correspondent who signs himself "A successful candidate" says that London can learn much from Cambridge. I agree, and the recent change of regulations at Cambridge operating from September last still further facilitates the path of the medical student to the B.A. degree when he has completed his pre-clinical studies.

The Court has to justify its distribution of the grants it receives from the Treasury and the London County Council. Justification would be considerably easier if the number of graduates at the London medical schools could be increased on orthodox lines and in accordance with elementary fairness. I submit this would be the case if the suggestion I have made could be adopted, and the demand which you describe as "legitimate" met—namely, that "grants designed to aid in the maintenance of a university standard of education for doctors should bear fruit in the production of university graduates." Your leading article points out that London University through its Court is really spending money upon the education of medical students who perhaps ought to be the responsibility of other bodies receiving grants from the Treasury—e.g., in the last year for which figures are available Cambridge received £158,000 and Oxford £125,000. But I feel sure that I am reflecting the opinion of my colleagues upon the Court when I say that the Court is, at present at any rate, content to regard all the students at the London medical schools, whether proceeding for the London degree

or not, as students of the University. In this connexion I may perhaps point out that the medical schools can materially help the Court in maintaining this attitude by impressing upon the non-London students at the London medical schools the importance of registering in the new class created by the present Statutes (No. 23), that of "Associate Students." The University has been disappointed to find how infrequently students who are eligible to become associate students avail themselves of the privilege by the payment of the very small fee (10*s.* 6*d.*) demanded for registration.

The correspondence which my first letter has evoked suggests that the present character of the final examination is largely responsible for the diminished number of students who actually graduate in medicine. Some figures furnished to me by the academic registrar's department bear out this contention in the low percentage of passes recorded during the past seven years.

	Candidates who sat for any part of the examination for the final M.B., B.S.	Candidates who passed both or either parts of the examination for the final M.B., B.S.	Percentage of passes.
1927..	420	288	68·6
1928..	412	216	52·4
1929..	444	270	60·8
1930..	452	246	54·4
1931..	445	246	55·3
1932..	443	224	50·6
1933..	475	254	53·5

Failures amounting to nearly 50 per cent. are in my submission unduly high for a first qualifying examination, and although this position in no way invalidates my plea for the new degree in the place of the second M.B., it suggests that the final examination is in urgent need of overhauling. There can, I think, be no doubt that the present curriculum is grossly overloaded, and the actual strain of the examination itself, lasting as it does for 25 days, is a serious fault, as pointed out by your contributor "A successful candidate." But I fear that unless the schools themselves take action little will be done to alter the curriculum. The Medical Curriculum Committee appointed by the University two years ago shows no signs of life, and its composition, comprising as it does a large variety of clashing interests, does not give much hope of any practical outcome of its labours.

I may say that I have been a member of the Court inspection of the medical schools of London upon nearly every occasion when an inspection was made, and I assert without hesitation that the present correspondence has been far more useful in suggesting reasons for the paucity of students taking the final medical examination in medicine than the information given at the inspections in answer to the question invariably put by the chairman at each visit: "How do you explain the small numbers of medical students who take London degrees?" If the medical schools can only be persuaded to think out these problems for themselves, to come to some agreed opinion and to impart that opinion to the Senate, much good would I am convinced result.

As chairman of the External Council for the past 12 years, I am extremely sympathetic with the letter from an external student in your issue of the 15th instant. His point that at the final examination the examiners should have some consideration of the fact that external students taught out of London may present views other than those of London teachers, illustrates the importance of the provision which was a part of the old statutes and has been unfortunately removed from the new—viz., that one examiner at least should be an external teacher. The External Council in its recommendation of examiners has endeavoured, with some success, to maintain this rule in practice notwithstanding that it is no longer statutory.—I am, Sir, yours faithfully,

E. GRAHAM-LITTLE.

Wimpole-street, W., Dec. 28th, 1934.

SEVERE GASTRIC AND DUODENAL HÆMORRHAGE

To the Editor of THE LANCET

SIR,—I am surprised to note the complacency with which blood transfusion is accepted as the routine method of treatment in severe gastric or duodenal hæmorrhage, and would suggest the use of liver extract as an alternative. At autopsy on cases treated by transfusion extreme œdema of the lungs is frequently noted. The patient has literally drowned himself. As soon as a patient is admitted in an exsanguinated condition, the medical attendant only too often orders an immediate blood transfusion regardless of the unnecessary movement which such a procedure entails, especially when veins are none too easy to find. I am quite certain that blood transfusion has by itself a certain mortality, and also that unless the vessel in the stomach is tightly sealed it will cause the bleeding to recommence.

I have made blood counts on patients, who on admission have had only about 1,000,000 red cells per c.mm. and 20 per cent. of hæmoglobin and have received a transfusion of a pint or more, and three or four days later I have found their counts raised by 3–400,000 red cells, provided there has been no recurrence of bleeding. I have also found that if one has the courage to wait, although a patient is obviously getting more and more anæmic, a stage is reached at which the bleeding ceases and this is usually not much lower than 1,000,000 red cells per c.mm. Those patients who bleed to death will do so in spite of all medical treatment, as it means that a large vessel has been eroded, and the only measure to adopt would be to open the abdomen and tie the bleeding point—a procedure usually out of the question, as by the time such a decision would be made, the patient is moribund.

We know that as soon as bleeding ceases, provided there is no sepsis, the bone-marrow starts turning immature red cells into the circulation, as a blood film the next day shows marked poikilocytosis, anisocytosis, polychromasia, and nucleated red cells. For some time I used blood transfusion for these cases, but was not impressed with the results, and when potent liver extract preparations came on the market it appeared to me that we had a weapon which could be used to stimulate the marrow and accelerate blood regeneration. In a few cases where daily injections of liver extract were used I found that not only did the blood count rise in three or four days by the same amount as with blood transfusion, but on examining a film the red cells were far more regular in size and shape, suggesting that maturer cells were being turned into the circulation. There is also some evidence that liver increases the coagulability of the blood. Iron may be given with advantage after a few days in order that the hæmoglobin may keep pace with the increase of red cells.

My suggestion is that patients with severe gastric or duodenal hæmorrhage should be treated by giving on admission an injection of a potent liver extract

and then left undisturbed or, if restless, given morphia. To lessen the thirst the patient should be allowed to take sips of cold water as he desires. The injections of liver extract, supplemented with iron after a few days, should be continued until the blood count is satisfactory. I am, Sir, yours faithfully,

Woodford Green, Essex, Dec. 28th, 1934. L. HEWLETT.

DOCTORS AND OSTEOPATHS

A PARALLEL CASE?

To the Editor of THE LANCET

SIR,—By a curious coincidence the recent debate in the House of Lords on the Registration and Regulation of Osteopaths Bill immediately preceded that on the Supreme Court of Judicature (Amendment) Bill, one of the objects of which is to increase the numerical strength of the bench. Were both measures to become law there would be an increase in the number of those qualified to sign death certificates and a smaller, but even more significant, increase in the number of those qualified to pronounce sentence of death. It was unfortunately taken for granted that these additional judges should be members of the legal profession, and a slur in consequence was cast on another body of men accustomed to dealing with questions of crime and punishment.

The principles of the Church and of the legal profession are fundamentally different. The theory of conscience and the punishments which an enlightened conscience may inflict is contrary to the administration of pain and penalties awarded in a court of law. But is it not desirable that every avenue should be explored to its utmost limit and the potentialities of the Church in the treatment of sin be more fully developed? It would be a simple matter to pass a Bill to enable bishops to sit on the judicial bench. A Board could be established armed with the necessary power to compile a Register of Bishops and to regulate their practice. The second main object of the Bill would be to impose upon the bishops a standard of professional training and competence, comparable to that of the legal profession, which would debar the Free Churches and the Salvation Army from the practice of spiritual discipline.

The Church (and by Church is meant the Church of England) differs from the law in that it usually prefers to dispense with the gaol and the gallows and lays emphasis on a standardised spiritual technique in dealing with the offender. It believes that so-called crimes are due to a maladjustment or misplacement of the spiritual framework of man and that the soul itself when it functions properly will know its own remedy for disease, under the skilled touch of the clergy. Obviously the difference between the legal and ecclesiastical schools is fundamental, but the country is entitled to know that in any addition to the judicature that is made the existing laws regulating the treatment of delinquency shall not allow any unnecessary or unreasonable obstacles to lie in the way of each school of thought developing its system for what it is worth. Bishops are at present labouring under a real disability. Their standard of education is high. They do not ask for admission to the legal profession, but they feel, and rightly feel, that they should have equal power to pronounce sentence of death and in general to sit in judgment on their fellows. It is surely unnecessary that a person should have a lot of legal training before he is able to convict others of error. If anyone were to go down to Whitechapel and summon a meeting of hard-living hard-swearing men and women and put before them the proposition that justice and mercy can only properly be dealt out by those who have had a legal training, he would be overwhelmingly defeated on the vote.

We must remember that at the present moment any judge who based his rulings on the instructions of a bishop would be under a ban. He would do so at his peril and might forfeit his pension. The Inns of Court therefore stamp the bishop as a quack or charlatan almost indiscriminately, and they have no means of helping themselves. The legal profession is notoriously conservative. It is not very long since the thumbscrew, the rack, and the stake had their recognised place in the administration of justice. It has always been opposed to any idea of justice which has been in the slightest bit in advance of the ordinary. Lawyers are indeed frightened that owing to the influence of the clergy their living may be taken away from them. But whatever the Law Society may do the Church is here and has come to stay, and the time is not far distant when every sensible family solicitor will send his clients to the parish priest as a matter of routine. A young fellow who has furnished the Inland Revenue authorities with an inaccurate return of his income—and it happens again and again—never thinks of going to the police. If he did he would be told to lie up for three months and get a stiff sentence. He goes to the parish priest and in a week is his usual self. It is indeed impossible to understand how anyone could refuse to a profession which now exists for good and is very widely extending in this country the necessary protection and privileges which a Bill such as the one we have been advocating would afford.

I am, Sir, yours faithfully,

Dec. 31st, 1934. W. F. H.

PS.—After reading the official report of the earlier debate I am left with the conviction that there is more joy in the House of Lords over one sprained ankle that an osteopath has manipulated than over ninety-and-nine tuberculous elbows which needed no manipulation.

UTERINE CONTRACTION

To the Editor of THE LANCET

SIR,—In your issue of Dec. 22nd, 1934, Dr. Samuel R. M. Reynolds offers an explanation of the discrepancy between the results obtained from my study of the contractility of the human non-pregnant uterus (Edin. Med. Jour., August, 1934), and those previously obtained by Knaus and by himself on the human species and on the rabbit. It is not clear what is meant when he says that the uterus was distended by "chemical means," but I assume that his criticism is similar to the one used by Knaus to dispose of Schultze's experiments which also went contrary to the previous work, and is, in short, that the comparatively high initial pressure used in the uterine cavity produced an unphysiological distention, and consequent abnormal irritability of the uterine musculature.

This criticism is reasonable, and pending further direct experimental evidence I am inclined to believe that it may account for some of the findings. I do not, however, believe that it offers a complete explanation of the discrepancy of the results. The intrauterine bag with which most of the work was done contains *when fully distended* only 3·2 c.cm. of fluid. Now, to quote from Knaus's recently published book ("Periodic Fertility and Sterility in Woman," p. 73):—

"On the sixteenth day of the cycle, however, a striking change begins to take place in the function of the uterine

muscle. To begin with the observer finds that he can introduce an extraordinary large quantity of water—8 or 10 c.cm.—into the balloon inside the uterine cavity before he feels any resistance . . . the uterus almost entirely loses its capacity for spontaneous contraction and becomes flaccid and sluggish."

It will thus be seen that in his experiments during the luteal phase of the menstrual cycle Knaus must have caused the uterine cavity to be distended to at least two and a half times the capacity which I found necessary in my work. Dr. Reynolds's criticism is thus not only negatived but actually reversed.

If, however, Dr. Reynolds wants to maintain that in my work the uterus may have been *locally* distended and irritated, I reply that the unalterable fact remains that the uterus in the second phase of the menstrual cycle is quite capable of powerful contractions if suitably stimulated; and it was my object in the address to show that increasingly powerful contractions could be recorded in the last two weeks of the cycle, which contractions finally merge into those of menstruation (when the uterine cavity is again distended as by a foreign body).

Again, Dr. Reynolds's suggestion offers no explanation of the fact that the uterus was found to respond to pituitrin (or vasopressin) at *all stages* of the cycle. Even if it can be shown that such a response is recorded only by a certain technique, the fact that it is present in the human species considerably weakens the value of the test for the date of human ovulation (refractoriness of the uterine muscle during the luteal phase to pituitrin) on which Knaus chiefly bases his law of periodic fertility in the human female. In my experiments the pituitary extract has always been given intramuscularly in the usual clinical dosage. It has not been given intravenously because of the increased risk of pituitary shock—a condition of not altogether rare occurrence, and, incidentally, one which may make the use of the crude extract a danger rather than a help in cases of traumatic shock.

Finally, I hope that neither in the original address nor in this letter has anything been said which might be construed as belittling the value of Dr. Reynolds's admirable experimental work, or of the equally outstanding and pioneering clinical investigations of Knaus. It is my object, however, to show that the matter is considerably more complicated than it appeared to be from the publications of these workers.—I am, Sir, yours faithfully,

CHASSAR MOIR.

Obstetric Unit, University College Hospital, W.C., Dec. 31st, 1934.

HEALING OF TUBERCULOUS CAVITIES

To the Editor of THE LANCET

SIR,—Your leading article of Dec. 15th under this title gives much food for thought. The remarkable results which can be achieved by rest alone, provided it is sufficiently complete *and* sufficiently prolonged, is perhaps not fully realised because the evil effects of the old adage about "going away for three months" still persists. But that this state of affairs is not universal was demonstrated to me during recent visits to sanatoria in Holland, where "graduated rest and exercise" has almost disappeared, where the sanatoria grounds are deserted, but where the patients are kept in bed for nine or twelve months, or longer if necessary. X ray photographs showed almost miraculous disappearance of huge cavities, some quite chronic, with no operative interference whatever. To the question, "but will your patients stop that long in bed?" one was met by a tolerant smile. It is a matter of tradition and example; in fact, patients sometimes protest when told to get up, having been alarmed by relapses witnessed in others who refused to continue with the strict rest.

On the other hand, visits to institutions in Scandinavia, where operative collapse treatment is so well developed, has convinced me that a note of warning must be sounded with regard to the advice contained in the statement: "If resolution is delayed or there is evidence of advancing disease artificial pneumothorax should be undertaken, supplemented, if necessary, by section of adhesions *or phrenic evulsion if cavitation persists*" (my italics). Phrenic evulsion—i.e., an irrevocable measure, to be distinguished from "phrenic crush" or the injection of alcohol into the nerve—must be resorted to with great caution and in exceptional circumstances only, particularly in the cases referred to here, for it is in these very patients that partial thoracoplasty, an operation giving excellent results in the hands of some people, may be indicated later. By performing phrenic evulsion one will have sacrificed the healthy base of the lung, jeopardising the success of the thoracoplasty, for an improvement generally problematical and at the most only transient.

I am, Sir, yours faithfully,

Oslo, Norway, Dec. 24th, 1934. G. GREGORY KAYNE.

SERUM PROPHYLAXIS AND PUERPERAL SEPSIS

To the Editor of THE LANCET

SIR,—I am quite ready to agree with Dr. Colebrook. Mrs. A, who died in three days from streptococcal infection, and the mouse which died after injection of a culture, both died for the same reason, and that reason was not Dick toxin. I do not know what residual poisons are elaborated by streptococci when toxin, if made (and many strains make little toxin), is neutralised; and I emphatically agree that we will make no great advance in the matter of streptococcal infection until we find out. But I am much more interested in Mrs. B: I think she exists, or rather existed, since she too died; and Dr. Colebrook does not. Mrs. B died in three days: she had to contest not only with these residual poisons but also with toxin (the Dick erythrogenic toxin, certainly), and also with a complex group causing endothelial damage, renal damage, gastric hæmorrhages, red cell hæmolysis, inhibition of phagocytosis, and diffusion of organisms—a group all of which are neutralised by antitoxin, but only when administered very early. Mrs. B had a double battle; she might have won against the residual factors, but succumbed to the last straw, the toxic complex. That is my hypothesis. It is only a hypothesis as yet, and will remain one until obstetricians are sufficiently convinced by the plausibility of the argument to give prophylactic serum an extensive trial. It may fail completely; Dr. Colebrook may be entirely right; streptococcal toxin may be only a laboratory reagent, of no significance in human infection. Many women, unfortunately, will still die, even if I am right; the residual factors that kill the mouse will kill them. If we knew how to neutralise them, prophylactic antitoxic serum might still have a value; but it would be insignificant in comparison with that great discovery. Meanwhile, are we justified in neglecting a prophylactic method because it is of limited efficacy? Do we refuse to put up an umbrella because it will not keep our feet dry?—I am, Sir, yours faithfully,

London, W., Dec. 31st, 1934. R. J. V. PULVERTAFT.

"LILY RASH" OR "PHOTOPHYTODERMITE"

To the Editor of THE LANCET

SIR,—Having read Dr. W. H. Palmer's description in your issue of Oct. 6th, 1934 (p. 755), of a disabling dermatitis suffered by pickers of daffodils and narcissi, it seems of interest to compare his remarks with those of Dr. Clément Simon in a recent issue (July, 1934) of *L'Orientation Médicale*. In this article Dr. Simon describes under the title of *photophytodermite* dermatitis occurring in sun-bathers as a result of lying in meadows or on banks where they break off, by their weight, the tops of growing plants. He suggests that the sun's rays are absorbed by the chlorophyll and an erythematous rash results. Kitchevatz (Yugoslavia) has made rigorous control experiments with ultra-violet rays, obtaining an erythema over the whole irradiated surface, but most markedly at the places where chlorophyll was present. With red rays he obtained an erythema *only* at the points where chlorophyll had been applied. In his experiments he found the erythema was most intense when the place was wetted with peroxide before dabbing on the chlorophyll. He sums up as follows. The moist skin, irritated mechanically or by sunlight, touches a plant. When the plant is broken the chlorophyll comes in contact with the skin. Exposure to red rays of these sensitised parts causes burns of the second degree with redness and blisters—due not to sensitiveness to the plants but to the exposure to light aided by chlorophyll. This is Kitchevatz's theory, which needs verification but seems to explain most of the clinical facts. If this theory applies to the rash described by Dr. Palmer it should be comparatively easy to try control experiments with workers in the flower fields shaded from the sun.

I am, Sir, yours faithfully,

A. S. TUXFORD, L.M.S. Hong-Kong.

British North Borneo, Nov. 15th, 1934.

VERTEBRAL ANGIOMATA

To the Editor of THE LANCET

SIR,—The annotation on this subject in your issue of Dec. 29th concludes with a statement which we think calls for criticism. Referring to the effect of radiotherapy upon these growths you say: "It has no effect on paraplegia—or indeed upon the radiographic appearances, which often show no correspondence with the symptoms." Our experience with a case which was fully described by us in 1932 (Jour. Neurol. and Psychopathol., 1932, xii., 231) proves definitely that in this instance radiotherapy alone led to the complete cure of severe cord compression by a hæmangioma of the eighth thoracic vertebra. In our paper we also pointed out that in the only two successful cases reported to that date radiotherapy was used immediately after operation, and we expressed the opinion that in view of the high operative mortality (60 per cent. to that date) X ray treatment should be used primarily. In our case also there was unmistakeable improvement in the radiological appearances of the affected bone following treatment. Our patient remains perfectly well, with normal power, reflexes, and sensation, though he had a severe paraplegia with extensor plantar responses, and a degree of spinal block which caused arrest of lipiodol at the site of compression.

We are, Sir, yours faithfully,

F. J. NATTRASS,
DONALD RAMAGE.

Newcastle-on-Tyne, Dec. 29th, 1934.

THE FIRST ANTENATAL CLINIC?

To the Editor of THE LANCET

SIR,—I should be much obliged for the courtesy of your columns to inquire for information regarding the establishment of the first antenatal clinic in this country. It appears that municipal clinics were first started during the early years of the war, in already existing infant welfare centres, but there do not appear to be any available official records as to when the first one was opened. Some of your readers may have some information on this point and I should be grateful if they would kindly communicate with me.—I am, Sir, yours faithfully,

F. J. BROWNE.

Obstetric Hospital, Huntley-street, London, W.C., Dec. 31st, 1934.

POST-OPERATIVE RETENTION OF URINE

To the Editor of THE LANCET

SIR,—I read with interest in your issue of Nov. 10th, 1934, Mr. N. R. Barrett's remarks on the treatment of post-operative retention of urine. In a similar investigation of retention after spinal anæsthesia (Jour. Egypt. Med. Assoc., 1929, xii., 122) hexamine gave a satisfactory result in 50 per cent. of the cases. Pilocarpine however—grs. 1/25 of the nitrate given slowly by intravenous injection—gave better results in our hands. Some of the patients actually urinated before the needle was withdrawn from the vein. Since then it has become our method of choice for the treatment of post-operative retention of urine.

I am, Sir, yours faithfully,

WILLIAM BOCTOR,
P.M.O., Government Hospital, Mansourah, Egypt.

Dec. 12th, 1934.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

The Christmas Adjournment

ON Dec. 21st both Houses of Parliament adjourned for the Christmas recess. The House of Lords will reassemble on Jan. 29th and the House of Commons on Jan. 28th. The customary motions were passed authorising the Lord Chancellor and the Speaker to call both Houses together earlier than these dates in case of emergency.

Health Conditions in the Mercantile Marine

In the House of Commons on Dec. 20th the British Shipping (Assistance) Bill was considered in committee. On Clause 1 Mr. N. MACLEAN moved an amendment providing that no subsidy under this part of this Act should be paid by the Board of Trade unless the Board were satisfied that—

(*a*) the wages paid to persons employed on the vessel during such tramp voyage were in accordance with the rates recognised by the National Maritime Board;

(*b*) the conditions of employment on board the vessel were of a reasonable standard for British labour;

(*c*) the vessel was fully and efficiently manned on deck and below.

The President of the Board of Trade was there, he said, to look after the conditions of the seamen as well as the seaworthiness of the vessel. It was his duty to look after the standard of the ship, and it was also his responsibility to look after the standard of life of the crew. He trusted that the right hon. gentleman would agree to accept this amendment, and that he would put it into operation as one of the

conditions which the advisory committee must bear in mind before a subsidy was granted.

Mr. RUNCIMAN (President of the Board of Trade) said that a subsidy would only be granted on the advice of the advisory committee. The initiative would not come from the Board but from the committee. The principle which they would be expected to comply with was that they should not recommend the payment of subsidy to ships whose owners had not complied with the National Maritime Board scale. There was no need to have that inserted. As to conditions of employment on board vessels the Board of Trade was charged with the duty under the Merchant Shipping Act, 1894, which was amended at a later date, of seeing that the condition of the forecastles and the sanitary equipment of the ship were fit and proper for those who sailed in the vessel. So far as construction of ships was concerned, there was no doubt that this country had reached a higher standard and provided a greater degree of comfort than at any previous time. That was the ordinary everyday work of the Board of Trade. As to the health of the men employed in the mercantile marine there could be no doubt that there had been a continuous improvement during the past 30 or 35 years. That was an improvement for which they ought to be grateful, and it had not been obtained by tacking on provisions to Bills to which they were quite irrelevant, but by a continuous improvement of administration. The food scale on ships was fixed by Acts of Parliament. That scale had to be varied from time to time. In foreign countries where it was possible to get fresh food the more fresh food seamen received. The more fresh food they got and the less tinned and preserved food the better. Ships had to pass through very trying climates, and elasticity was all to the good. That was an example of the way the matter was worked now, and he begged the committee not to imagine that things were as bad as had been made out.

Prevention of Overcrowding

Sir HILTON YOUNG (Minister of Health) presented on Dec. 20th a Bill to make further and better provision for the abatement and prevention of overcrowding, the redevelopment of areas in large towns in connexion with the provision of housing accommodation therein, and the reconditioning of buildings, to make provision for the establishment of a housing advisory committee and of commissions for the management of local authorities' houses, to amend the enactments relating to the housing operations of public utility societies and other bodies, to provide for the consolidation of housing accounts, to amend the enactments relating to housing; and for purposes connected with the matters aforesaid.

Sir GODFREY COLLINS (Secretary of State for Scotland) presented a similar measure for Scotland.

Both Bills were read a first time.

HOUSE OF COMMONS

THURSDAY, DEC. 20TH

Vaccination Technique

Mr. GROVES asked the Minister of Health whether he was aware that the public vaccinator of Walsall, Staffordshire, upon receipt of 1*s.*, vaccinated with one mark only, but vaccinated with three other marks freely; and whether, in view of the fact that instructions were given to vaccinators, after the last Royal Commission, to vaccinate with one mark only, he would instruct the vaccinator in question to stop vaccination with four marks.—Sir HILTON YOUNG replied: I have no knowledge of the circumstances described in the first part of the question. As regards the second part no such instructions have been given to public vaccinators. The relevant instruction in the Third Schedule to the Vaccination Order, 1930, provides that, while ordinarily the public vaccinator should vaccinate in one insertion, he may, if he considers it necessary, increase the number of insertions in cases in which he or the vaccinee desires that additional protection should be obtained. It rests with the local authority to see that a public vaccinator observes the terms of his contract.

Physical Training for Girls

Mr. JOEL asked the Minister of Health whether his attention had been called to the statement of his chief medical officer emphasising the need for the national development of physical training, culture, and guidance for girls of all classes in this country; and whether he proposed to take any action to provide such development.—Sir HILTON YOUNG replied: The answer to the first part of my hon. friend's question is in the affirmative. With regard to the second part my hon. friend is aware that action in many forms in the direction indicated is now taken alike by public authorities and voluntary bodies, and so far as the matter lies within my responsibility such action has my full encouragement.

FRIDAY, DEC. 21ST

Women in Industry

Mr. DOBBIE asked the Minister of Labour if there had been an increase in the number of women entering industry during the last ten years; and, if so, what was the rate of increase.—Captain AUSTIN HUDSON (Lord of the Treasury) replied: The following is the statement asked for: The only statistics compiled in my department as to the numbers entering industry relate to persons entering employment which is insurable under the Unemployment Insurance Acts. These statistics are available only for the period since 1925, and the figures for women and girls for each year in that period are as follows:—

New Entrants into Unemployment Insurance in Great Britain

Year. July. June.	Women and girls.	Year. July. June.	Women and girls.
1925–1926 ..	376,644	1930–1931 ..	330,505
1926–1927 ..	355,085	1931–1932 ..	302,325
1927–1928 ..	365,564	1932–1933 ..	304,134
1928–1929 ..	360,930	1933–1934 ..	308,402
1929–1930 ..	364,595		

A detailed analysis of the numbers of women and girls entering insurable employment in the period 1925–34 is given on pages 388–389 of the *Ministry of Labour Gazette* for November, 1934.

Consultative Health Councils in Scotland

Mr. LLEWELLYN-JONES asked the Secretary of State for Scotland what consultative councils were originally established under Section 5 of the Scottish Board of Health Act, 1919, and which of these councils still continued to function; how many members there were on each of the existing councils; and how many meetings of each of the councils had been held in the years 1932, 1933, and 1934 respectively.—Sir GODFREY COLLINS replied: By Order in Council dated Dec. 20th, 1919, four Consultative Councils were established under Section 5 of the Scottish Board of Health Act, 1919, as follows: (1) Medical and Allied Services; (2) National Health Insurance (Approved Societies' Work); (3) Local Health Administration and General Health Questions; (4) Highlands and Islands. With the exception of the Consultative Council for the Highlands and Islands, the constitution of which is at present under consideration by the Department of Health for Scotland, all these councils are still functioning. The information which the hon. Member desires in regard to the membership and meetings of the councils is contained in the following Table, viz.:—

Consultative Council.	Members.	Meetings of council and subcommittees.		
		1932.	1933.	1934.
(1)	20	8	1	—
(2)	15	2	1	1
(3)	16	5	—	4
(4)	14	—	—	—

Yellow Fever in Gambia Colony

Mr. DAVID GRENFELL asked the Secretary of State for the Colonies whether, in view of the restrictions on account of yellow fever in Gambia Colony, any explanation was

given to the local population of the curfew and quarantine regulations, the closing of schools, and prohibition of public worship; and whether the orders to this effect were issued in the customary manner.—Sir PHILIP CUNLIFFE-LISTER replied: Statements were issued by the senior medical officer explaining the quarantine and other measures which the Government of the Gambia decided to enforce at Bathurst on account of the recent outbreak of yellow fever. I have not received from the Governor copies of the actual orders issued, but he has my fullest support in taking prompt and drastic action to deal with the emergency.

OBITUARY

ERNESTO PESTALOZZA

THE death is announced, having occurred on Christmas Day, of Signor Ernesto Pestalozza, the well-known gynæcologist and professor of obstetrics in the University of Rome.

Ernesto Pestalozza was born in Milan in 1860, and received exceptional opportunities for the development of his talents by close association with several important universities. To this wide range of activity he owed his recognition by learned bodies in other countries. His first prominent work was accomplished in Genoa, where as quite a young man he filled the chair of obstetrics. Thence he migrated to Florence where he associated his clinical duties as a professor with valuable public work in relation to infant welfare. In 1906 he was elected professor of obstetrics and gynæcology in Rome, and he now founded the journal *Ginecologia*, in which he wrote much himself and for which he secured many important contributors. In addition to original pathological work in connexion with malignant disease of the chorion, he made valuable studies on tuberculosis of the genitalia and important contributions to the study of uterine mechanism, devising original operations for the relief of prolapse. He was a frequent figure at medical congresses, local and international, and was a member of scientific associations and academies in many countries, including the Royal Society of Medicine and the Society of Obstetricians and Gynæcologists in Edinburgh. In Italy he was a pioneer and energetic worker in the cause of infant welfare, and as a member of the Senate he was a forceful advocate of the causes of hygiene.

PROF. PESTALOZZA

PATRICK MANSON RENNIE, M.B. Aberd., D.P.H., Lt.-Col. I.M.S.

THE death occurred on Dec. 16th in Diss of Dr. Patrick Manson Rennie, medical officer of health for the district. He was born in China, the son of Dr. Thomas Rennie who practised for many years in Foochow and who was associated there in his early work with Patrick Manson after whom he named his son.

Patrick Manson Rennie was born in 1884 and went to the University of Aberdeen for his medical education. He graduated in medicine there in 1906 and entered the Indian Medical Service in 1909 where he saw much service before, during, and after the war. He was for a time civil surgeon at Raipur, and in 1912 took advantage of leave to acquire the diploma of tropical medicine and hygiene at Cambridge, while he also obtained the diploma of public health at his own university. During the war he served in the Gallipoli and Mesopotamia campaigns with the India forces and was twice mentioned in dispatches. Returning to India after the armistice, he saw further war service on the north-west frontier, and finally retired from the service in 1929, when he settled in Diss in general practice. Both as a doctor and a public officer he acquired great popularity from his ability and efficient conduct of his duties, taking an active part in all phases of social and public life. He leaves a widow, Dr. Gertrude Rennie, who also graduated in medicine at the University of Aberdeen with honours. His death is felt as a real loss to the community in which he worked.

SAMUEL BACKWELL FENN, L.R.C.P. Edin.

THE death took place on Dec. 1st at Stackhouse, Yorkshire, of Dr. Samuel Backwell Fenn who had been a well-known medical practitioner in Southport. He obtained his Scottish qualifications in 1886 and was for a short time resident physician in a hydropathic establishment in Southport. He then engaged in missionary work and for ten years was a medical missionary in Madagascar, where he was senior surgeon to the Missionary Hospital in Antananarivo, and presided over the medical academy of the island. He returned to England in 1896 and began his long connexion with Southport by acting as physician to the Hesketh Park Hydro. He did much war work in connexion with the Red Cross and was energetic in the foundation of the military hospital in the town. Always much interested in ambulance work he was an active figure in the Southport St. John Ambulance Brigade, lectured frequently on its behalf, and was appointed an officer of the Order of St. John of Jerusalem. He was associated both with the Y.M.C.A. and the Southport Temperance Society and was a prominent Baptist. He retired from practice in Southport some five years ago and went to reside at Stackhouse. Dr. Fenn was a widower and leaves three sons and a daughter.

WILLIAM THOMPSON HALL, M.D. Edin.

William Thompson Hall, who died on Dec. 18th, 1934, was born in 1869, a native of Otterburn. He received his medical education at the University of Edinburgh where he graduated in 1893. He then served as house physician to the Royal Infirmary and was also a demonstrator of practical pathology and anatomy in the medical school of the University. He had long been resident in Newcastle-upon-Tyne, conducting a large practice in Heaton and the east end of the city, while he was also honorary physician to the Newcastle Dispensary. He leaves a widow, a daughter, and one son, Dr. H. W. Hall, who is also in practice in Newcastle.

JOHN CUNNINGHAM BOWIE, M.B. Glasg., D.P.H.

THE death occurred on Dec. 22nd of John Cunningham Bowie, who was a frequent writer on questions in connexion with tuberculosis. He received his medical education at the University of Glasgow and graduated there as M.B., C.M. in 1889. Shortly after qualification he went to Cardiff to practise and became prominent in his advocacy of better sanitation for the mining population. The prevalence of tuberculosis among them led to a wide propagation of theories as to the notification of phthisis and the possible value of treatment by high-frequency currents. He wrote and lectured upon many aspects of electrical therapeutics and on the causation of cancer, where he was unable to persuade his colleagues to share his views. He contributed to the Transactions of the Institute of Mining Engineers a paper on ankylostomiasis dealing with its prevention in British coal-mines, and throughout his long career among a mining population kept the health of the miners steadily in view.

WILLIAM HANTON HARRIS, M.D. Aberd.

THE death of Dr. William Hanton Harris which occurred on Dec. 5th put a sad end at the age of 33 to a promising career. He graduated in medicine with honours at Aberdeen in 1923, proceeding later to the M.D. degree, and after acting as assistant physician to Murray's Royal Asylum went into the sanitary service. His first appointment was as assistant M.O.H. to the county borough of Kingston-upon-Hull and the port sanitary authority. He then became assistant M.O.H. and school medical officer for the county of Salop and M.O.H. for the Ellesmere urban and rural districts; and only a few days before his death had been appointed M.O.H. of the Doncaster rural district. Dr. Harris's death after a short illness followed an operation; he leaves a widow and one child.

NEW YEAR HONOURS

THE list of honours issued on Jan. 1st contains the names of the following members of the medical profession:—

Baronet

Sir Holburt Jacob Waring, C.B.E.
President of the Royal College of Surgeons of England; consulting surgeon, St. Bartholomew's Hospital.

K.C.V.O.

Edmund Ivens Spriggs, M.D., F.R.C.P.
Senior physician, Ruthin Castle, N. Wales.

Knights Bachelor

John Boyd Orr, M.D., F.R.S.
Director, Rowett Institute, Aberdeen.

Walter Langdon Brown, M.D., F.R.C.P.
Regius professor of physic, the University of Cambridge; consulting physician to St. Bartholomew's Hospital.

Raphael West Cilento, M.D.
Senior medical officer, Department of Health, Commonwealth of Australia.

Lieut.-Colonel Jamshedji Nasarvanji Duggan, C.I.E., O.B.E., D.O. (Oxon.), F.C.P.S. (Bombay).
Professor of ophthalmic medicine and surgery, Grant Medical College, Bombay.

C.B.

Major-General James Fitzgerald Martin, C.M.G., C.B.E., M.B.
Honorary surgeon to the King.

C.M.G.

Lieut.-Colonel Sydney Price James, M.D., F.R.S.
Medical officer and adviser on tropical diseases to the Ministry of Health; member of the Malaria Commission of the League of Nations, Geneva.

William E. Jones, M.R.C.S.
Director of mental hygiene, State of Victoria.

John Clarence Webster, M.D., F.R.C.P. Edin., F.R.S.
Late professor of obstetrics and gynæcology, Rush Medical College, University of Chicago.

C.I.E.

Lieut.-Colonel Edward Selby Phipson, D.S.O., M.D. I.M.S.; Civil administrative medical officer, Aden.

Major Henry James Rice, M.C., M.D. I.M.S.; Indian Military Hospital, Poona.

C.V.O.

Guy Capper Birt, M.R.C.S., L.D.S.
Surgeon dentist to H.M. the King.

C.B.E. (Civil)

Catherine Chisholm, M.D.
Honorary physician, Children's Northern Hospital, Manchester.

David Llewelyn Williams, M.C., F.R.C.S. Edin.
Senior medical officer, Welsh Board of Health.

O.B.E. (Military)

Lieut.-Colonel George Duncan Ralph Black, V.D., M.D.
Lately principal medical officer, Hong-Kong Volunteer Defence Corps.

Surg.-Commander Walter Cecil Murray, L.D.S., R.N.

O.B.E. (Civil)

Albert Reginald McLeod, M.D.
Chief staff officer, St. John Ambulance Brigade, N.S.W.

Joseph Welsh Park Harkness, M.A., M.B.
Deputy director of health, Government of Palestine.

Major Sahibzada Ahmad Khan, M.B., B.S.
I.M.S.; civil surgeon, Hazara, North-West Frontier Province.

Percy Ward Brigstocke, M.B.
Director, Victoria Hospital, Damascus.

Edna Mary Guest, M.B.
Chief of department of surgery, Women's College Hospital, Toronto.

M.B.E. (Civil)

Alexander Jardine Hunter, M.D.

James Douglas Alleyne, M.D.
Port health officer, Barbados.

Khan Bahadur Abdul Qadir Khan, L.M.S.
Lately civil surgeon and superintendent, Kohat Jail, North-West Frontier Province.

Kaisar-i-Hind Medal

Reginald John Hands Cox, M.B.
Afghan Mission Hospital, Peshawar.

Gottfried Oram Teichmann, M.B.
Medical missionary, Baptist Mission, Chandraghona, Bengal.

Order of the Hospital of St. John of Jerusalem

The following promotions and appointments among medical men to the Venerable Order of the Hospital of St. John of Jerusalem have received Royal sanction:—As Knight of Grace: Dr. J. J. Holland. As Commander: Dr. W. H. Turton. As Officer: Lieut.-Colonel R. M. Gorssline, D.S.O., Dr. Alphonse Lessard, Colonel H. D. Johnson, Dr. J. Prior, Major-General Sir Frank Powell Connor, D.S.O., Dr. Florence Barrie Lambert, C.B.E.

MEDICAL NEWS

University of Cambridge

At recent examinations the following candidates were successful :—

THIRD EXAMINATION FOR M.B. AND B.CHIR.

Part I., Surgery, Midwifery, and Gynæcology.—A. W. Abramson, D. G. Allen, H. F. Anderson, J. S. Bailey, R. C. B. Barbor, W. M. Beattie, F. R. Berridge, G. Blackburn, F. Braithwaite, W. G. Brander, S. G. Brook, N. P. Brown, J. W. D. Bull, E. J. Bury, L. I. S. Campbell, J. N. Cave, A. E. Cohen, W. T. Cooke, J. S. Cookson, H. D. Davies, J. F. Dow, E. P. H. Drake, G. D. Elphick, E. A. Evans, T. S. R. Fisher, L. R. Gardner, G. P. Goodwin, E. O'D. C. Grattan, C. U. Gregson, C. Hardwick, J. R. G. Harris, R. B. Heisch, E. D. Hoare, M. Hynes, R. F. Jarrett, W. H. H. Jebb, R. Kauntze, H. T. Laycock, N. C. Lendon, I. W. MacKichan, P. E. C. Manson-Bahr, F. R. R. Martin, E. B. Z. Masterman, J. B. C. Murdoch, J. F. Paterson, J. H. Patterson, E. E. Pochin, R. J. Porter, J. S. Richardson, G. S. Robinson, R. E. Rodgers, J. R. Rose, S. B. H. Saunders, D. S. Scott, H. S. Sharp, A. H. M. Siddons, F. A. Simmonds, J. P. Singer, F. Stansfield, J. H. Stotbert, R. F. Tredgold, H. J. Wallace, J. F. L. Walley, J. G. Webb, S. R. F. Whittaker, E. G. K. Williams, A. G. Carr, and O. K. Tubby.

Part II., Physic, Pathology, and Pharmacology.—A. G. V. Aldridge, K. C. Bailey, F. R. Berridge, D. A. S. Blair, J. R. Bodington, C. H. T. Bond, J. C. Buckley, R. J. Buxton, L. I. S. Campbell, J. G. Chappel, L. A. Collins, R. H. Dale, S. M. Davidson, J. R. Dickinson, A. B. R. Finn, A. C. Fraser, H. S. H. Gilmer, E. O'D. C. Grattan, W. H. C. M. Hamilton, W. S. Haynes, C. L. Heanley, R. B. Heisch, F. G. Hinks, M. J. Ingram, W. H. H. Jebb, R. M. Jones, H. B. D. Kettlewell, A. H. Knowles, J. H. Lankester, F. D. M. Livingstone, K. Lumsden, E. B. McDowall, C. R. McLaughlin, J. W. Macmillan, J. D. Martin Jones, F. H. Masina, G. J. H. Maud, K. M. Mayall, J. H. Moseley, L. O. Mountford, J. B. C. Murdoch, N. C. Oswald, W. H. Phillipps, G. D. Pirrie, A. R. Pope, M. S.-M. Rayner, J. S. Ross, S. K. Sen, J. H. Shakespeare, G. S. Steele-Perkins, B. Thorne Thorne, G. C. Tooth, P. A. Walford, E. O. Walker, G. E. Walker, H. A. Wallace, J. N. Warren, W. Warren, C. J. G. White, N. Whittaker, P. H. Willcox, H. Drummond Robinson, and D. P. Firmin.

Society of Apothecaries of London

At recent examinations the following were successful :—

Surgery.—J. W. D. Bull, Univ. of Camb. and St. George's Hosp. ; and H. W. Smithies, St. Mary's Hosp.

Medicine.—J. E. Garson, Univ. of Madras and West London Hosp ; and W. J. Pinto, Univ. of Madras.

Forensic Medicine.—S. Adams, Charing Cross Hosp. ; H. Burrows, Univ. of Manch. ; J. E. Garson, Univ. of Madras and West London Hosp. ; G. R. Hopper, Univ. of Liverp. ; N. R. James, London Hosp. ; S. Krishman, Univ. of Sheff. ; A. Lassman, Univ. of Manch. ; T. I. Palmer, St. Bart.'s Hosp. ; W. J. Pinto, Univ. of Madras ; and H. L. Williams, Middlesex Hosp.

Midwifery.—G. E. Ftyaras, Univ. of Athens and St. Mary's Hosp. ; A. Lassman, Univ. of Manch. ; N. O. Lucas, Univ. of Oxford and Guy's Hosp. ; G. W. Van Mentz, Charing Cross Hosp. ; G. Williams and W. C. Winterbottom, St. Mary's Hosp.

The following candidates, having completed the final examination, were granted the diploma of the society entitling them to practise medicine, surgery, and midwifery : J. W. D. Bull, A. Lassman, and G. Williams.

University of Liverpool

At recent examinations the following candidates were successful :—

M.D.

F. J. Burke, H. V. Corbett, A. T. Jones, W. E. J. Jones, and R. W. Thomas.

M.CH. ORTH.

W. S. Creer, N. S. Gunning, E. C. B. Jones, J. B. Reid, N. W. Roberts, and D. Wainwright.

M.B., CH.B.

A. J. McCall (with first-class honours).

Part A. (1924 *regulations*).—S. V. Cullen and H. W. E. Jones.

Part B.—F. A. Frank, A. Gleave, E. L. Jones, H. H. L. Pentz, and R. E. Wilson.

Part I. (1929 *regulations*).—A. H. Baxter, J. C. Birchall, J. G. Bogle, Agnes Y. Bowie, Eileen Chrimes, S. E. Cooke, F. W. Crook, R. E. A. Davies, F. C. Deller, E. W. Evans, Jennet Evans, N. M. Hancox, R. P. Harbord, E. A. K. Hoppins, F. Lanceley, F. T. Madge, and Margaret J. Roberts.

Part II.—P. A. Dixon, T. Laithwaite, Moira Murray, and Joan Watts.

Part III.—A. O. Karsteadt, F. A. Lomax, S. Shulman, A. Speight, S. L. Strange, R. P. Tong, J. K. B. Waddington, M. M. Wallis, and Margaret C. Winter.

D.P.H.

E. Taylor.

D.T.M.

S. K. Appleton, S. O. Awoliyi, J. J. A. Cantin, S. W. Cooper, P. C. Cosgrove, R. Y. Dunlop, A. A. Gibbons, S. L. Kallianpurkar, D. C. M. Macpherson, Z. Z. Nyi, W. E. Strangeway, and T. T. Wu.

Dr. A. A. Gibbons has been recommended for the Milne medal.

WE regret to announce the death on Dec. 31st of Dr. Walter Stacy Colman. He had long retired from practice through ill-health, but was consulting physician to the Hospital for Sick Children, Great Ormond-street, and had been physician to out-patients at St. Thomas's Hospital and assistant physician and pathologist to the National Hospital for Paralysis, Queen-square.

British Medical Association: Scholarships and Grants in Aid of Research

The Council of the B.M.A. is prepared to receive applications for research scholarships and grants for the assistance of research in connexion with disease.

Scholarships.—These are as follows :—

An Ernest Hart Memorial Scholarship of the value of £200 per annum, a Walter Dixon Scholarship of the value of £200 per annum, and three Research Scholarships each of the value of £150 per annum. The scholarships are given to candidates whom the Science Committee of the Association recommends as qualified to undertake research in any subject (including State medicine) relating to the causation, prevention, or treatment of disease. Each scholarship is tenable for one year, commencing on Oct. 1st, 1935. A scholar may be reappointed for not more than two additional terms and is not necessarily required to devote whole time to the work, but may hold a junior appointment at a university, medical school, or hospital provided the duties of such appointment do not interfere with the work as a scholar.

Grants.—Grants for the assistance of research into the causation, treatment, or prevention of disease will be made to applicants who propose as subjects of investigation problems directly related to practical medicine.

The scholarships and grants will be made preferentially to members of the medical profession and applications must be made not later than May 11th on the prescribed form, a copy of which will be supplied on application to the medical secretary of the Association, B.M.A. House, Tavistock-square, London, W.C.1. Applicants are required to furnish the names of three referees who are competent to speak as to their capacity for the research contemplated.

London Jewish Hospital Medical Society

The annual dinner of this society was held at the Trocadero Restaurant on Dec. 9th, with Sir Humphry Rolleston as the guest of honour. The next meeting will be held at the hospital at 3.45 P.M. on Thursday, Jan. 17th, when Sir William Willcox will open a debate on focal sepsis, and the speakers will include Dr. E. Stolkind, Dr. C. C. Worster-Drought, and Prof. E. Fraenkel.

A Course in Venereal Diseases

A series of lectures and demonstrations on modern methods in the diagnosis and treatment of venereal diseases will be held on Tuesdays and Thursdays from Jan. 8th to April 2nd, at 6 P.M., at the Municipal Clinic, 155, Regent-road, Salford. The course will be given by Dr. E. Tytler Burke, the medical officer of the clinic, and attention will be directed chiefly to the diagnosis of late or chronic syphilis and the adequate treatment of acute or early cases. Attendance at the course will qualify for the Ministry of Health certificate. Further particulars may be had from Dr. Burke.

Royal Society of Arts

The Sir Henry Truman Wood memorial lecture of this society will this year be given by Sir Gowland Hopkins, P.R.S., on Wednesday, Feb. 6th, at 8.30 P.M., and is entitled the Study of Human Nutrition—the Outlook To-day. On Jan. 23rd, at 8 P.M., Mr. C. L. Burdick will speak on Humidity, Health, and some New Inventions, and on Jan. 28th and Feb. 4th, at the same hour, Miss Harriette Chick, D.Sc., on Diet and Climate. The society's house is in John-street, Adelphi, London, W.C. 2.

Fellowship of Medicine and Post-Graduate Medical Association

A demonstration on the fundus oculi will be given by Mr. Lindsay Rea at 8.30 P.M. on Tuesday, Jan. 15th, at the in-patient department of the West-End Hospital for Nervous Diseases, and a second on electrocardiograms, the interpretation of tracings, will be given at the Medical Society of London (11, Chandos-street, W.) on Wednesday, Jan. 23rd, at 8.30 P.M., by Dr. Kenneth Harris. Pathological demonstrations, which will be given on Thursdays

at 3 P.M. at the Wellcome Museum of Medical Science, Euston-road, London, include one on some modern aspects of malaria, by Dr. C. M. Wenyon, on Jan. 17th; another on electrocardiograms, by Dr. William Evans, on Jan. 24th; and a third on examples of Bright's disease, by Dr. Dorothy Russell, on Jan. 31st. A series of surgical tutorial classes will be given on Tuesday and Thursday evenings at the National Temperance Hospital at 8 P.M., beginning on Jan. 15th. Subjects of special courses include cardiology at the National Hospital for Diseases of the Heart (Jan. 14th to 26th); urology at St. Peter's Hospital (Jan 21st to Feb. 2nd); dermatology at St. John's Hospital (Jan. 28th to Feb. 28th); and manipulative surgery at 5.15 P.M. at the Medical Society of London (Jan. 29th to Feb. 1st). There will also be a week end course in heart and lungs at the Royal Chest Hospital (Jan. 19th and 20th). Further particulars may be had from the secretary of the Fellowship, 1, Wimpole-street, London, W.1.

La Nomade

This international society, which undertakes the responsibility of medical automobile tours on the continent, announces that the next tour will take place in South Italy and Sicily. The tourists will leave Paris on Saturday, April 13th and will visit among other places Naples, Pompeii, Capri, Amalfi, Messina, Taormina, Catania, and Palermo. The tour will last until May 2nd; the inclusive cost is 3300 francs, expenses outside this sum being incurred for railway travelling to the rendezvous and back, tickets being available for 45 days. All information will be furnished by the organiser of the tour, Dr. Cavro, 15, rue Jules-Ferry, Paris, XIII.

Appointments

HAMILTON, C. J. K., M.B. Camb., F.R.C.S. Edin., has been appointed Resident Surgical Officer to the Hull Royal Infirmary.

HYNES, WILFRED, M.B. Leeds, F.R.C.S. Eng., Honorary Assistant Surgeon to the Sheffield Royal Hospital.

King's College Hospital.—The following appointments are are announced:—

KENDALL, A. W., M.S. Lond., F.R.C.S. Eng., Assistant Surgeon;

MUIR, E. G., M.S. Lond., F.R.C.S. Eng., Assistant Surgeon; and

WINGFIELD, A. L., M.B., M.R.C.P. Lond., Senior Medical Registrar.

London County Council Hospital Staff.—The following promotion is announced:—

NORRIS, T. ST. M., M.B. Camb., M.R.C.P. Lond., D.P.H., Senior Assistant Medical Officer (Grade I.).

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Infirmary.—Radiologist. £1200.

Bath, Royal United Hospital.—Hon. Radiologist.

Beckenham, Bethlem Hospital, Monks Orchard.—Res. H.P. At rate of £150.

Bolingbroke Hospital, Wandsworth Common, S.W.—Hon. Physician for Diseases of Children.

Bradford Royal Eye and Ear Hospital.—Jun. H.S. £150.

Bristol Royal Infirmary.—H.P.'s and H.S.'s. Each at rate of £80. Also Cas. H.S. At rate of £100.

British Post-Graduate Medical School, Hammersmith, W.—Three First Assts. for Dept. of Medicine. £250–£500.

Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency O. Also H.S. Each at rate of £130.

Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C.—Part-time Pathologist. £250. Also First and Third Assts. for Out-patients' Dept.

Chester Royal Infirmary.—H.P. and H.S. Each £150.

Colchester, Essex County Hospital.—Asst. H.S. £120.

Colchester, Royal Eastern Counties' Institution, &c.—Asst. M.O. £350.

Coventry and Warwickshire Hospital.—H.S. to Spec. Depts. At rate of £125.

Croydon, County Borough.—Asst. M.O.H. and Asst. School M.O. £500.

Evelina Hospital for Sick Children, Southwark, S.E.—Fourth Physician. 50 gns.

Exeter, Devon Mental Hospital.—Jun. Asst. M.O. £350.

Exeter, Royal Devon and Exeter Hospital.—H.P. At rate of £150.

Folkestone, Royal Victoria Hospital.—Sen. and Jun. Res. M.O.'s. At rate of £150 and £120 respectively.

General Post Office.—Asst. M.O. £510.

Great Yarmouth, General Hospital.—H.S. £140.

Hampstead General and North-West London Hospital, Haverstock-hill, N.W.—H.P. At rate of £100.

Hospital for Consumption and Diseases of Chest, Brompton.—Asst. Director of Radiological Dept.

Hospital for Sick Children, Great Ormond-street, W.C.—Out-Patient Med. Reg. £250. Also Surg. Reg. £200.

Hull Royal Infirmary.—First H.P. At rate of £175.

Ilford, King George Hospital.—Hon. Dermatologist.

Ipswich, East Suffolk and Ipswich Hospital.—H.S. £120.

Leicester Royal Infirmary.—Hon. Radiologist.

Lincoln County Hospital.—H.S. At rate of £150.

Liverpool Royal Infirmary, Medical School.—Medical Tutor and Registrar. £120.

Liverpool School of Tropical Medicine.—Caton Memorial Research Fellowship. £400.

Liverpool University.—Res. Obstet. Asst. and Tutor. At rate of £250.

London Hospital, E.—First Asst. in Dept. of Physical Medicine. £150.

London Lock Hospital, 91, Dean-street, W.—Surg. Reg. £100.

Lowestoft Borough.—Part-time Consultant for Ear, Nose, and Throat.

Manchester, Ancoats Hospital.—Res. Surg. O. £200.

Manchester, Monsall Hospital for Infectious Diseases.—Deputy Med. Supt. £600.

Manchester Royal Infirmary.—Seven H.S.'s, four H.P.'s. Also three H.S.'s to Special Depts. Each at rate of £50.

Manchester, Withington Hospital and Institution.—Jun. Asst. M.O. At rate of £250.

Mansfield, Harlow Wood Orthopædic Hospital.—Two H.S.'s. Each at rate of £200.

Metropolitan Hospital, Kingsland-road, E.—Res. Cas. O. £100.

Metropolitan Water Board, Rosebery-avenue, E.C.—Bacteriological Research Asst. £550.

National Temperance Hospital, Hampstead-road, N.W.—Med. Reg. 40 guineas.

Newcastle General Hospital.—Med. Reg. At rate of £250. Two H.S.'s and H.P. Each at rate of £150.

Newcastle-upon-Tyne Hospital for Sick Children.—H.P. and H.S. Each at rate of £100.

Norwich, Norfolk and Norwich Hospital.—H.P. £120.

Nottingham General Hospital.—H.S. At rate of £150.

Putney Hospital, Lower Common, S.W.—Gynæcological Surgeon.

Royal Dental Hospital, Leicester-square, W.C.—Hon. Asst. Anæsthetist.

Royal National Orthopædic Hospital, Great Portland-street, W.—Hon. Radiol. Also H.S. for Country Branch. At rate of £150.

Scunthorpe and District War Memorial Hospital.—Res. Surgeon. £250.

Sheffield Royal Infirmary.—Ophth. H.S. Asst. Cas. O. and Asst. Aural and Ophth. H.S. Each at rate of £80.

Southend-on-Sea General Hospital.—Res. Obstet. and Gynæcological Officer. At rate of £125.

South London Hospital for Women, Clapham Common, S.W.—Asst. Surgeon.

St. John's Hospital, Lewisham, S.E.—Res. Cas. O. At rate of £100.

Stockport Infirmary.—H.S. £150.

Stoke-on-Trent, North Staffordshire Royal Infirmary, Hartshill.—Hon. Asst. Ophth. Surgeon.

Surrey County Mental Hospital Service.—Jun. Asst. M.O. £350.

Victoria Hospital for Children, Tite-street, Chelsea, S.W.—H.P. and H.S. Each at rate of £100.

Western Ophthalmic Hospital, Marylebone-road, N.W.—Hon. Anæsthetist. One guinea per visit.

West London Hospital, Hammersmith-road, W.—Hon. Asst. Radiol.

Wolverhampton Royal Hospital.—H.P. At rate of £125. Also Two H.S.'s to Special Depts. Each at rate of £100.

York, Friends' Retreat.—Jun. M.O. £300.

Medical Referee under the Workmen's Compensation Act, 1925, for the Selkirk Sheriff Court District (Sheriffdom of Roxburgh, Berwick, and Selkirk). Applications should be addressed to the Private Secretary, Scottish Office, Whitehall, London, S.W.1, before Jan. 21st.

Births, Marriages, and Deaths

BIRTHS

DAVIES.—On Jan. 1st, 1935, at 27, Welbeck-street, to Vera, the wife of Dr. Daniel T. Davies—a daughter.

HILLIARD.—On Dec. 27th, at Meadway, N.W., the wife of Cedric Hilliard, M.B. Camb., of a son.

MARSHALL.—On Dec. 25th, at St. John-street, Lichfield, the wife of F. W. Marshall, M.D. Durh., of a daughter.

DEATHS

ELLIS.—On Dec. 19th, at Victoria, British Columbia, Henry Reginald Ellis, M.B. Durh., Barrister-at-Law, sometime Assistant Director of Medical Services, Nigeria, in his 62nd year.

FINCH.—On Dec. 22nd, suddenly, at Beechfield, Yelverton, Devon, Ernest James Finch, C.M.G., Surgeon Rear-Admiral, R.N., of Windyridge, Drayton, Cosham.

KINGSFORD.—On Dec. 27th, at Padcroft, Ashford, Middlesex, the residence of his daughter, Perceval Kingsford, M.R.C.S. Eng., aged 87 years.

LAVER.—On Dec. 28th, at Cheyne Walk, Northampton, Basil Leslie Laver, M.S. Lond., F.R.C.S. Eng., aged 40.

MCDONNELL.—On Dec. 26th, at a nursing-home, Datchet, Joseph Reveille McDonnell, M.D., R.U.I., and Fleet Surgeon R.N. (retired).

PENTON.—On Dec. 26th, at The Rookery, Dedham, Colonel Richard Hugh Penton, D.S.O., late A.M.S., aged 71.

SKINNER.—On Dec. 23rd, Charles Gordon Lennox Skinner, M.D. Aberd., The Reddings, Rhos-on-Sea, N. Wales, and formerly of Harpurhey, Manchester, in his 84th year.

THOMAS.—On Dec. 25th, at The Cottage, Chandler's Ford, Hants, Archibald Thomas, M.R.C.S. Eng., aged 82.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

HYPNOTISM *

BY HILDRED CARLILL, M.D. Camb.
PHYSICIAN TO WESTMINSTER HOSPITAL

HYPNOTISM has been known for centuries and probably it was discovered indirectly by the effects produced in the laying on of hands. It remains mysterious and it will never cease to interest, but as it has come into line to some extent with modern psychological conceptions it is no longer regarded as magical or occult. By its means a process of unconscious motivation has been demonstrated, and also the probability of a series of mental levels at which different processes take place. It is difficult for anyone to get a grasp of the subject merely by reading, and it is no less difficult for the hypnotist himself, even in the presence of the results which are produced. Hypnotism can be described although it cannot be explained and, although no one fully understands it, an account of an individual experience may be helpful. My own experience is derived from practice as a general physician, and a habit of inquiry is set against a poverty of knowledge and a still greater poverty of understanding. The direction of a man's thought is necessarily guided by the expression of the thoughts of others, and in this sense there are many to whom I owe a debt; but what I shall say here is drawn from my own experience.

Some General Considerations

The ability of any individual to hypnotise certain people is probably universal, but there are not many who have the wish to try their hand at it. Possibly there are many patients who remain uncured because of this. On the other hand, the capability of a man to be hypnotised, quite apart from those who have certain varieties of insanity, is probably not universal. A madman may be a hypnotist. If a hypnotist becomes insane it will not be solely because he is a hypnotist. Delusions of magnetic influence and the hypnotic power of secret societies are common. Some hypnotists can be hypnotised, but I have not heard of anyone who can alternate with the same individual the rôle of hypnotist and subject. Nevertheless, in terms of the activity displayed, it is the subject rather than the hypnotist who excels, although he does so in a negative sense. The hypnotist is not aware of anything proceding from him to his subject and any fatigue he may feel is due either to time or to his anxiety to succeed, conditions which are merely incidental to his association with the patient. I have wondered whether a man who is hypnotised can of his own volition hypnotise someone else.

Some writers explain the phenomena of hypnosis in terms of two factors, dissociation and increased suggestibility. These are related to each other, but they are not identical. They mutually interact, but not invariably, and each may occur in the absence of the other. Dissociation with consequent loss of identity, which is spontaneous in the sense that no cause is apparent at the time, occurs fairly commonly, and often it is amenable to hypnotic treatment, whereas the very similar dissociation which follows epilepsy and cerebral trauma is not. Day-dreams also are common and probably there is a tendency towards dissociation in everyone, owing to emotional conflicts.

In 1918 I treated a soldier for complete loss of identity. His condition was associated with a resumption of the attributes of babyhood. The illness occurred suddenly in England three months after the cerebral commotion in France to which it was attributed. He had not suffered a skull injury. He was taught as a baby is taught. After two months he suddenly recovered his identity but at the expense of all he had been taught, and once again he had to be educated.

Some say that it is only hysterical patients who can be readily hypnotised and that hypnosis is an artificially produced manifestation of hysteria. The hypnotist thus exploits their extra-suggestibility and makes use of it further to impose his suggestion. The subjects of hysteria however are far from being universally hypnotisable. Healthy people have the faculty of becoming extra-suggestible when they are passing into natural sleep, and a man who cannot by any standard be said to be hypnotised may accept suggestions more readily then than at any other time. Complete and permanent psychological good health is uncommon. It appears to depend on the efficiency of repressing forces, for the subconscious mind itself never sleeps. A man who is psychologically ill may or may not be hypnotisable, but a man who is psychologically whole must be regarded as unhypnotisable. If we assume for the sake of description that such a man is hypnotised the inference is that the estimate of his health was inaccurate, and in any case the train of dissociation which he embarks on makes him, in this sense and from that moment, a hysterical patient.

There is no universal law of conduct in hypnosis. Patients show degrees of ability to accept suggestion and maintain its influence even although the induction has been easy and an apparently deep sleep has been produced. Symptoms may persistently resist prolonged counter-suggestion, even although the cause appeared to be clear enough to both parties before the induction and although no fresh facts emerged from hypnotic conversation. In some of these cases, however, the cause does not emerge even in hypnotic sleep and the obscurity may prove to be due to the hypnotist having been misled by the story as narrated awake and thus having covered in hypnosis a part only of the patient's life area.

Hypnosis of itself does not help a sick man although, often, involuntary movements cease and, always, so it is said, a stammerer speaks without a stammer. I have seen several cases in which movements have ceased at the moment of transference, but have recurred at once and persisted.

In 1919 I treated a soldier for mutism. He had enlisted in 1915 and became a corporal. He had stammered occasionally since childhood but only when he was excited. In November, 1916, he stammered at the moment of giving an order and two months later, when he was in hospital, he became mute. When I first saw him three years later he was still mute and every attempt to speak was associated with clonic spasm of his jaw. I hypnotised him, and so did others, but the spasm persisted and he remained mute even when the jaw was held.

In natural sleep hysterical palsies and spasms may disappear, but in hypnotic sleep suggestion is necessary if they are to be cured and the deformity of spasm may need manipulation. Hysterical rapid breathing likewise remains unaltered. It is sometimes said that in hypnosis the uncritical element of the mind becomes dominant at the expense of that which was developed later, but a hypnotised man may nevertheless wake spontaneously, at any rate from the earlier phases of dissociation, rather than accept suggestions which involve antisocial conduct.

It is unjustifiable to employ hypnotism save for a specific medical purpose. There is no discredit in dissociation either when it is spontaneous or induced, but nevertheless it cannot, by our standards, be regarded as laudable. A subnormal intellectual efficiency is implied. A man who has been repeatedly hypnotised may become so dependent on his hypnotist that he cannot maintain his improvement in his absence, and moreover a blind obedience may result which can be embarrassing and even dangerous.

* A lecture-demonstration to the London Hospital Medical Society on Feb. 8th, 1934.

The Purposes of Hypnotism

In any consideration of hypnotism it is right to think carefully about the ways in which a patient may be helped. There are two legitimate purposes and they often interact. They are investigation and treatment. There is a third reason, which is subsidiary to and included by the others—namely, the teaching of doctors. A hypnotist discovers by trial what is called his power, but he does not try until he has watched the technique of others.

Consciousness is not the whole of mental life, and the purpose of investigation is for the discovery of forgotten experiences. These can often be proved to act harmfully, in the form of conflicts. They are not recalled by the patient after he is waked, and it is the hypnotist who makes use of them, both when they emerge and afterwards. He employs his fresh knowledge in such a way that the patient's mental continuity is restored and phobias and split personalities are thus sometimes resolved. It is necessary for the hypnotist to employ a correct and sufficient technique and instruct the patient if his experiences are to be recalled. Hypnotism is by no means the only way of achieving this. All emotions, motives, and experiences are stored in the mind. A man during the course of general anæsthesia may speak in a language which he has completely forgotten and which indeed he may deny having ever known. Some people are able by a natural effort to recall to memory very distant experiences, but the memory of most seems to become automatically better in hypnosis. The truth emerges, uncoloured by the faults of memory. A man in open conversation may purposely withhold his emotional content. He may, for example, be on his guard if he knows he is homosexual. On the other hand, he may withhold it out of ignorance. There is often considerable drama in listening to a hypnotised patient narrating his early experience, and I remember a stammerer recalling the onset of his stammer at the age of four as he ran home crying from a pond where he had been paddling after hearing his nurse shout to him that the snakes would bite him. If confirmation of the experiences can be obtained it may be helpful, but it is not necessary, for, as I have said, there is no occasion for doubt. I believe that experiences which can be confirmed may be recalled out of the second year of life and not earlier. Abreaction, which is the emotional re-living of a man's experience, may occur during hypnosis and if it occurs it may remove the cause of his symptoms. The hypnotist, as a rule, leads him towards it but it may occur naturally. On the other hand, it may be counter-suggested and the story obtained without it. When it occurs it is not always complete. It may be very considerable, or slight only. One of my patients showed severe abreaction in 1930 when he was taken over a terrifying experience of 1917. He was, however, soon able to speak about it calmly, but in spite of this he sweated copiously and being unaware on being waked of what he had been saying, was always astonished at his condition. Some physicians deny the need of the revival of the emotional component in order to cure symptoms; they trust to the revival of the unpleasant component alone.

Often in the natural sleep of healthy people there is an escape by some of the mental elements which, in the waking state, are set apart. They take advantage as it were of the sentry's inattention and demonstrate their freedom in the form of dreams. Sometimes these dreams remain vivid after the patient wakes. If, however, they are but vaguely remembered and are thus of no value to the physician they are none the less of considerable potential value, for they may be re-dreamed in detail in hypnosis and by a purely spontaneous process. Sleep-walking, which always has a mental cause, is the reaction to a dream, but it is a dream which is not in the patient's consciousness after he wakes. It is said that sleep-walkers are invariably hypnotisable and that their dreams may be recalled in this way, but I have failed to hypnotise a number of them.

Hypnotic experiences and conversation, whether direct or overheard, are not always recalled by the patient after he is waked, even although the hypnotist during hypnosis has directed that they shall be. But often something is recalled although the patient does not know what it is, for in order to obey orders for the future which were given during hypnosis he re-enters the hypnotist's influence and then executes them without further suggestion. But some patients recall nothing at all after they have been waked and consequently neither re-enter nor obey. The man's mental scene as set by the hypnotist before induction is commenced may be dreamed throughout hypnosis and referred to, as a dream, on waking. All hypnotic experience as a rule is recalled in subsequent hypnosis, at any rate when it is produced by the original hypnotist and provided he has not, during hypnosis, forbidden its recall, and the patient may talk about it spontaneously as well as in conversation. In a case where the nature of fits is uncertain the diagnosis will be aided if, in hypnosis, a hysterical attack is successfully suggested. But in order to witness an attack it is not always necessary to employ hypnotic suggestion.

The second purpose of hypnotism is therapeutic, and treatment may help a man even although the exact cause of the symptoms has not emerged. He may be taught to make a better adjustment to the conditions in which he is compelled to live, also hysterical symptoms may be removed. Insomnia is sometimes treated by hypnotism whether it is due to pain or is merely the result of habit, and hypnotism has often been used as a substitute for a general anæsthetic. I tried to hypnotise a man for a major operation by using scent instead of ether. Nothing was said to him of the substitution. The experiment failed, although he had proved easily hypnotisable by ordinary methods. The whole or any part of sensibility can be abolished in hypnosis but in many hysterical patients it can be abolished equally readily by mere verbal suggestion, without hypnosis. One patient, for example, shows that she feels the touch of a wisp of wool whereas she allows me at the same moment to transfix her tissues with safety pins in the same area and elsewhere. Tickle sense differs from other forms of sensibility in being most acute when the skin is stimulated by someone else. The hypnotist has to be careful about the form of his suggestion. For example the expression "You will sleep lightly," or "You will wake promptly" may be misinterpreted and the man may wake during treatment. If a patient has had a hysterical symptom and has recovered, the hypnotist should be careful to exclude from his demonstration the part which was affected.

Hypnotism without a Hypnotist

A man may appear to hypnotise himself whereas in reality he has re-entered the hypnotist's influence. This re-entry may have been ordered or it may be voluntary on the patient's part so as to do something which has been ordered. The order to sleep may be conveyed by a signal or merely a glance or the hypnotist may communicate it by telephone or through the post. The man is under the control of the hypnotist and, although he may wake of his own accord, the hypnotist alone can rouse him.

In 1926 I saw the Egyptian fakir who appeared on a London stage. He claimed to hypnotise himself. If this was the case, was the method he employed his own discovery or the result of imitation, or had he originally been hypnotised and taught the method? Again, was he not demonstrating re-entry although at a distance from his hypnotist or was the hypnotist present on the platform? The audience were told that tongue-swallowing was a necessary part of the ritual of the fakir's self-hypnotism but I find it difficult to accept this. A man can be hypnotised without even a close observer being aware that hypnotism has been employed. If during hypnosis a

man's conduct is controlled even a little by someone else the inference is that he has been hypnotised by him. The fakir's demonstration was vastly interesting, but, for me, it was spoilt when it was claimed by the interpreter that, in hypnosis, the fakir would prophesy the winner of the Derby. He did in fact closely approach the name of the horse that won. It is within the province of anyone to prophesy from guess, deduction, observation, and information, but it is not to be believed that a man, solely because he is hypnotised, has any peculiar power of interpreting the future. I have no experience of telepathy, but it is claimed for some people that during hypnosis they have telepathic power or that their existing power is much enhanced. I have no special difficulty in subscribing to this view.

There are some hysterical people who pass into trance without clear cause and who remain there for a prolonged period, often exhibiting katatonia and spontaneous anæsthesia. No one can influence their behaviour and no one can rouse them.

In 1918 a boy of 16 was under my care who was affected in this way. The attacks had occurred twice or thrice weekly since he was seven and he said that his father, aged 42, and his brother, aged 18, were similarly affected. His longest trance had lasted two days. I witnessed several attacks. They occurred, as a rule, suddenly. The lids remained open, the eyes staring and directed forwards, without squint. He blinked at unexpected sounds. The forehead was puckered. He took no notice of any cutaneous stimulus, although no word was said to him about this. On one occasion after six hours he spontaneously recovered his sense of pressure-pain and this was a long time before his attack resolved. Once in an attack he appeared to be asleep and took no notice of his food. He was anæsthetic save on the cornea, but he blinked in the presence of light. On recovery he complained of headache. On another occasion he woke at 2 A.M. saying that he felt queer. In ten minutes he was in a trance and the loudest noise failed to rouse him. He remained thus for ten hours and then, after a dramatic display of opisthotonus, he woke. Once, in an attack when he was standing up, he was roused to a slight extent by faradism. When he was immersed he uttered a few grunts. To all other stimuli he was anæsthetic. He stood motionless for two hours and the chalk lines round his feet were undisturbed. He then dropped quietly to the ground, had an attack of opisthotonus, woke up, asked where he had been and ate his dinner. I entirely failed to hypnotise him.

Precautions

It is unwise to say that you can or will hypnotise anyone until you have made a trial, but the fact that a previous hypnotist was unsuccessful is not necessarily proof that you will fail. Success is not precluded by the patient being restless or showing uncontrolled movements. Obtain the patient's consent and, in some cases, have it in writing. Disregard a statement such as "I had such a good night that I do not feel sleepy." Often on the first occasion an audience may distract the patient and the hypnotist and yet you should not be alone with a woman. Before you start, write down the headings of what you wish to find out or suggest, and write down also the results directly they occur as it may be impossible to remember the phase to which each of them belongs. If you propose to suggest or demonstrate sensory anomalies you should first know accurately the existing reactions to stimuli. Successful induction in my experience occurs the first time or not at all, and even at the first trial hypnosis may be deep; I am not concerned here with light hypnosis, in which the patient remains associated although in a state of enhanced suggestibility. A man's reaction to hypnotic induction seems to be based sometimes on fear, sometimes on confidence. It is said that sleep can be encouraged by a few days' premedication with 20 drops of cannabis indica, given thrice daily; I have no experience of premedication in any form. The first attempt to hypnotise may produce either a slow or rapid result, but afterwards the result as a rule is rapid.

Occasionally after a rapid first induction the patient resists sleep subsequently and the second induction is slow. The patient's coöperation, as well as his consent, is necessary at the outset, but once the man has been hypnotised the hypnotist will succeed even against the man's will, in the sense that he will no longer be able to exert it. This increased susceptibility as time goes on is regarded by some as evidence of the hypnotist's unsuccessful resynthesis. If the man is hypnotised lying down he may require to lie down in the future before he will sleep, but he can be taught in sleep to ignore his position. Once the hypnotist has obtained control the position is immaterial; the man will sleep where he stands.

Technique

Let the patient lie down and relax his muscles. Many people find it difficult to relax, even although their attention has been immobilised. Do not tell him to think of nothing at all, for this is impossible. Ask him to imagine himself somewhere where the scene is familiar, pleasant, and neutral, such as a punt in a backwater, and to pretend to feel drowsy. He may be able to help this simulation by emphasising his expiration. He should pay no attention to the hypnotist, once the procedure has been commenced; for illustration, the ease of inattention in church can be employed. Tell him that you will instruct him when he is to start listening, for this is not required until after dissociation has occurred. I then tell my patients to look at me and at once to transfer their gaze to some object which I hold in front of their eyes. They are told to continue to stare at it, if possible without blinking. As a rule a bright object is used, a watch, an eyeglass, a torch, but the object is immaterial. During this stage the hypnotist suggests ocular fatigue, speaking in a monotone but confidently. It is seldom necessary to make passes and many patients dislike it, although it may be useful in obtaining relaxation. The hypnotist brings the light nearer and nearer to the man's eyes and tells him that he can no longer keep them open. When the lids have closed he tells him that he is unable to open them of his own accord. If dissociation takes place the faculties are at once reduced but they can be restored to full activity at a word, without waking the patient. There are several features in a technique of this kind which resemble those of sending a child to natural sleep. The relationship between hypnotist and patient is a peculiar one and hypnotism lends itself to great elaboration of technique. This is not necessary, but it may produce an enhanced effect on an expectant audience and, also, it may cover deception.

The familiar conception of the hypnotic eye becomes less attractive when you have seen a blind man hypnotised. The hypnotist himself may be blindfolded. The effect produced by eye on eye is considerable and may be unpleasant. It may be almost impossible to avoid re-seeking the stare which we know is upon us. The feeling invoked is commonly one of guilt or fear, but we are not hypnotised. The human eye can influence animals, and animals can influence man as well as their kind. A rabbit may remain motionless in the presence of a weasel, not hypnotised but from fear.

Rotation of the Eyes

At the moment of dissociation the eyes rotate upwards and the expression alters. The patient may become restless for a few moments. Rotation occurs the instant before the lids close. It is outside the range of voluntary power. Sometimes a man will appear to make a great effort to remain associated, opening his eyes at once and relaxing his rotation; he may repeat this behaviour several times. A few more words by the hypnotist makes dissociation complete. Rotation takes place in the natural movements of blinking and also in natural sleep, although it is absent in general anæsthesia. It does not always persist during sleep. In blinking it occurs simultaneously with the dropping of the lids

and is thus unobserved. The individual himself is unaware of it, and if, when he is hypnotised, he is asked the position of his eyes he does not know. Very occasionally the rotation takes place just in advance of the movement of blinking; it can thus be observed, but it is not pleasant to see. A common opportunity of observing rotation is afforded when a patient with facial palsy tries even gently to shut his eye, but rotation even so is not invariable. I am treating a patient who has complete right-sided facial palsy. All her voluntary ocular movements are healthy but neither of the eyes rotates, either when she shuts the unaffected eye or exerts herself to close them bilaterally. I do not know the significance or mechanism of this rotation. It is symmetrical. Its direction upwards is invariable and, if the muscles of upward rotation are paralysed, it does not occur in any other direction. A few cases have been described in which rotation occurs in association with eye closure in spite of palsy of voluntary movement. Encephalitis lethargica may be associated with attacks of oculogyric rotation. The appearance of a man who looks upwards when he has incomplete bilateral ptosis closely resembles that of dissociation.

If the hypnotist opens the man's lids the rotated eyes are seen not to be squinting, and in this respect they differ from the state in natural sleep. They usually come down and are directed forwards as the lids are separated, and then they may wander laterally, with squint. This is because the man is unseeing and the squint disappears directly he is told to see. If the eyes are already directed forwards at the time the lids are opened they may rotate upwards under observation; also if the man is told that his lids are going to be closed he may rotate the eyes upwards in anticipation. Dissociation can be taught to occur without any rotation and indeed without any closure of the lids. Re-association can similarly be taught. If a hypnotised man who has his eyes open is told to wake his lids close for an instant as he does so, but even this can successfully be counter-suggested. Interference with the eyes often wakes the patient, just as it does in natural sleep.

Rapid Hypnotism

Once a man has been successfully hypnotised he can be taught to become dissociated instantly and apparently deeply on future occasions, in response to any signal which has been selected. This may be a stare, a click of the fingers, a written word or a word spoken in a whisper. It is immaterial whether he is alone or amongst a crowd, but he must understand the significance of the signal. It is also immaterial whether or not he is with the hypnotist, for he can be hypnotised by telephone and wireless. This is important in relation to the association of hypnotism with crime and alibi. The suggestion to sleep thus becomes a conditioned stimulus, after the manner of Pavlov's experiments, the man's suggestible state being due to a suppression of natural responses which might otherwise be expected to compete with those which the hypnotist evokes. Re-association in response to a signal occurs equally rapidly and, once again, dissociation, and as both phases can be produced without any coincident eye change or alteration of the features it may be impossible for an observer, even with the closest scrutiny, to identify the man's condition. It is difficult to believe that these rapid and repeated alterations are harmless but I have no evidence that harm results.

The patient sleeps only if he is satisfied that it is the hypnotist who addresses him, but as voices sometimes are very similar and as a voice can be cleverly imitated there must be opportunities of deceiving a man. The chances of two professed hypnotists having similar voices are small. My experience does not extend to these matters, but I think that the man would wake rather than obey directly he found himself in doubt. If a pretender hypnotised him by a coincidence of voice and gave him orders, he would obey him as he would obey his own hypnotist. If no orders were forthcoming he would awake, from ignorance of what to do. I have often hypnotised hospital patients by telephone from my house. I ask them to tell me when they are asleep.

Post-hypnotic Behaviour

If the hypnotist wishes the patient to re-enter his influence he can usually ensure it even at a distance by giving instructions either before, during, or after hypnosis, but if re-entry is not desired he should counter-order it before he wakes him, for, as I have said, it may otherwise occur spontaneously. Sleep of re-entry may thus resemble spontaneous trance or the loss of identity as in epilepsy. When the man is once again awake he will have no knowledge of what he has done but, unlike the other conditions, he will recount it in subsequent hypnosis. I have failed to produce any post-hypnotic behaviour in the absence of re-entry. The fact that re-entry has taken place may easily escape observation. It does not follow that an order to re-enter, given in hypnosis, will be obeyed.

The difficulties in identifying a man's state can be illustrated by a patient who has multiple forms of sleep in varying sequence, natural, pathological, hypnotic, and sleep due to spontaneous re-entry. Transferences from one variety to another take place frequently and some of them I can direct. In hypnotic sleep and re-entry I alone can influence him: in pathological sleep no one can rouse him. His original attack was during the war and developed as a mechanism of escape from terror, the reason for terror being at the time unproved and the cause unshared. I have often hypnotised him and when I tell him to wait a little after I have waked him and then count aloud to six he invariably re-enters and then obeys. He is proved to be under my influence at these times, but I am never required to remind him what to do. Sometimes he has an attack of pathological sleep during hypnosis or directly after he has been waked, but this does not interfere with his re-entry for, when everyone has forgotten that there was anything to witness, he re-enters in the middle of what he is doing and promptly counts aloud.

If the influence of another hypnotist is not desired it should be counter-ordered during hypnosis, but some patients already have the ability to resist, and neither when hypnotised nor awake can they say why others fail. I have a patient who is able to resist with ease although I have tried hard to break down his resistance both when he is awake and during hypnosis. If a man understands from his hypnotist that a second hypnotist is to act as his deputy he may sleep for him, and a child may thus produce hypnosis or even a man who is himself hypnotised. If the original hypnotist remains in the room a man may resist the substitute. It must be remembered that in the course of time the force of any suggestion is apt to grow less and an order may thus be forgotten. I hypnotised a man repeatedly during the war and eventually ordered him in hypnosis to resist my influence in the future. The result was that I failed to hypnotise him. I did not see him or communicate with him for ten years, but nevertheless when he came to see me I hypnotised him instantly with a single word and without leaving my chair.

A man who has been told before hypnosis what to do during hypnosis will do it without the hypnotist making any further hypnotic suggestion, but after he has been waked he will not recall what he did even though he was told before hypnosis that he would. If he is told before he is hypnotised that his conduct at that moment will be unremembered after he has been waked he will not remember it, although during hypnosis he has spontaneously recalled it in detail. If the hypnotist, before hypnosis, has said nothing about recollection the man will recall by the ordinary process of memory. Non-recollection during hypnosis of prehypnotic behaviour can also be successfully suggested before a man is hypnotised as well as during sleep. Thus if a man hands me £5 before I hypnotise him I can arrange

both at the time he gives it to me or in his sleep that both when he is asleep and after he has been wakened he will forget what he did with it. I do not know whether a hypnotist can obliterate a man's identity although he can be taught to forget his name and address. If after he has been waked he is told to repeat his hypnotic conduct he will do so only after a process of re-entry.

During hypnotic sleep a man can be taught to recall his hypnotic actions after waking. Post-hypnotic conduct, ordered during sleep, will be demonstrated according to my experience only if re-entry takes place, and although re-entry may have been suggested during sleep it will occur just the same without the suggestion. If, however, there has been no hypnotic suggestion towards re-entry it may not occur; if it has been forbidden there will be no post-hypnotic manifestations. Re-entry takes place, as the patient explains both when he is hypnotised or awake, without anything requiring to be done having been in his mind at the time. He may say merely that he felt the presence of the hypnotist. What has to be done becomes clear to him only after he has re-entered.

Evidence of Hypnotisation

A careful consideration of the evidence is important, for a man may pretend that he is hypnotised; also he may deny afterwards that he was hypnotised. There are several pitfalls. There is no yawning and no laughter, although the man will laugh if he has been told to behave naturally. I asked a hypnotised man why he never laughed, and he said that laughter had not been ordered but that he often laughed inwardly. I have watched a man play bridge in such a natural manner that the others did not suspect his condition. He is obedient only to the hypnotist, in the absence of suggestion otherwise, and his passivity is notable; he does not ask the hypnotist to wake him, or that he may wake himself. When he is told to walk about and do things his eyes are as a rule directed forwards and the lids almost closed. He opens his eyes directly he is told to. Some patients maintain the upward rotation as they walk about and, being unable to see where they are going, bump against the furniture; it is notable however that they do not grope their way as a blind man does and as a man might if he was pretending to be hypnotised. The persistence of rotation and eye closing may be due to the hypnotist's insistence on "You cannot open your eyes," during the induction. Persistent rotation sometimes occurs but with the lids open. It ceases when the patient is told to look forwards. Some patients, before they achieve a forward gaze and apparently in an effort to avoid it, bring the eyes by a sudden movement from elevation to extreme depression. Flickering of the lids indicates that the man is not hypnotised; it is due to restless eyes. You might expect that a man, at the moment of dissociation, would drop something which you had put into his hand, but he does not let go unless you have told him to. Your influence over his conduct has no special value for differential diagnosis for, if he is pretending, he will do most unexpected things if he is told to. Note what you say to him and his replies, and test him later. If he has been hypnotised he will recall nothing but if he has been pretending he may repeat the conversation out of ignorance. If during exploration a man's story varies in detail from that which he told before, it can be inferred that he is hypnotised, particularly if the story can be corroborated. If you ask a man whom you think is hypnotised whether he is or not he may reply that he knows he is because of a "drawing feeling."

You may believe that a patient is hypnotised whereas he has merely fallen asleep. Although a man becomes hypnotised during your procedure it does not follow that he is under your influence; you may find that he does not talk to you and that you cannot rouse him. This condition may be due to his re-entry into the influence of a previous hypnotist, a state which your procedure has suggested.

The failure of your suggestions is no evidence that you have failed to hypnotise. In seeking to demonstrate your influence on a man's muscular power remember that he may show very great power by an effort of will, although it is in hypnosis that the extremes of flaccidity will be manifested. As regards the sensory side a patient awake may bear a great deal of pain without showing it, if he is so minded, and you have seen that without hypnotism the most profound alterations in sensibility, involving even the cornea, can be produced at a word in a hysterical patient. Hypnotic suggestion in the field of sensation should have comprehensiveness, otherwise you may be surprised when a man whom you cannot hurt with a pin tells you that he can hurt himself very much with it. Sometimes there is analgesia in hypnosis without any suggestion towards it.

There is a common fallacy that when analgesia is due to hypnotic suggestion the tissues can with certainty be transfixed bloodlessly. This however can sometimes be done in health, when sensation is perfect, and in cases of analgesia it can be done just as certainly when this is due to physical disease as when it is hysterical. In none of these conditions is transfixion necessarily bloodless. There is a reputed association between dermographia and hysteria; I have found it far more commonly in vagotonia. A form of dermographia which may resemble the physician's skin-writing has been observed to occur spontaneously in emotional individuals.

I do not know any reliable criterion of the depth of sleep, but perhaps the distance of memory recall and the subject's readiness, after being waked, spontaneously to re-enter the hypnotist's influence may be so regarded. A man has no better knowledge of the duration of his hypnotic sleep than of healthy sleep. Failure to obey is apparently no criterion of the depth of sleep, nor is difficulty in waking the man up; the hypnotist has no difficulty, provided that the subject slept for him and has remained under his influence. Whatever the apparent depth of the sleep a man may wake spontaneously even in the face of a continued order not to do so, and this is particularly liable to occur if the eyes are investigated or when the order is unconvincing.

On waking the man may rub his eyes and seem dazed, but he does not yawn. If he complains of headache it is slight and transient. Some patients appear to have no knowledge whether sleep has been artificial or natural. A patient who had often been hypnotised re-lived on one occasion, after being waked, his life of 12 years before, when his hypnotic treatment had commenced. No allusion to that period had been made. He did not know that his spectacles belonged to him and he asked what the ear-phones were for. He came back into the present gradually and without assistance.

If during hypnosis the hypnotist had arranged for a substitute to wake the patient he could leave the man without feeling anxiety, but if this had not been done the man would either remain hypnotised until he woke spontaneously, or he would transfer himself into natural sleep from which he would wake in due course or could be roused by anyone. If a patient of mine persisted in remaining hypnotised and I could not reach him to wake him I should suggest a general anæsthetic in the hope that his dissociation would give way. A woman who re-entered my influence in my absence half an hour after I had waked her and left the hospital was still unable to be roused by anyone 24 hours later. I was sent for and waked her. I could have saved a journey if she had been taken to a telephone.

Some Causes of Failure to Hypnotise

Failure is fairly common even although success is ultimately attained, and the reasons lie with the patient rather than the hypnotist. He may be over-interested or distracted; a distended bladder is

enough to prevent hypnosis. The man may fall into natural sleep or he may sleep naturally after first passing through a brief stage of hypnotic sleep. There may be coöperation and yet sleep may have been forbidden by a previous hypnotist, either when the man was awake or hypnotised. My house physician failed to hypnotise a man whom I had hypnotised. The patient could not account for it but, as soon as I hypnotised him and asked him how it was, he said that in previous hypnosis I had forbidden him to be influenced by anyone else. Presumably this was accurate, but I had forgotten it. The patient may protest that he is coöperating, whereas he is stoutly resisting, and this may be due to an anxiety about the procedure in general or to a fear of what he may be caused to do or say.

Relationship Between Hypnotism and Crime

In the opinion of Baudouin and others the dependence of a subject on his hypnotist is a result of an autosuggestion on the subject's part which is merely the outcome of a superstition about hypnotism. Accordingly the important thing is to destroy the superstition about hypnotic dependence, for the risk of a patient obeying orders which may involve criminal conduct will then become small. A recital of the dangers of hypnotism, in this sense, is supposed to keep the superstition alive and consequently is dangerous. It is said moreover that hypnotic conduct which the hypnotist may think is due to his own suggestion is really dictated by the hypnotic liberation of the subject's autosuggestion, and that in this lies a safety against criminal behaviour. But although this view may well be the correct one, how is the superstition to be destroyed and how long will it take to do so? In the meantime some attempt must be made to protect the public against possible results of the superstition. The fixity of superstitions in a changing world is notable, and is an indictment against progress in education. I believe that it is right to face the fact that there may be a close relationship between hypnotism and crime and that, accordingly, it may be assumed sometimes to be demonstrated.

I do not know whether a hypnotised man is likely to be provoked spontaneously into committing crime but presumably, if he is like other people and susceptible to it when awake, he would not acquire complete immunity solely because of hypnosis. If the hypnotist orders antisocial conduct the subject usually shows his natural resistance by a refusal and, often enough, by waking up. This resistance becomes less, however, after repeated hypnosis and finally is overcome, so that the man becomes dependent on the hypnotist and his behaviour automatic. Even if he retains any autosuggestions derived from his emotional deductions and which are separate from the hypnotist's intentions and instructions, his behaviour is no longer influenced by them. If the hypnotist is unscrupulous there is cause for considerable anxiety, whatever theory of psychology you may hold. The subject, reawakened, would recall nothing of value and he would already have been taught in hypnosis not to repeat anything to a subsequent hypnotist. Perhaps the greatest danger lies in the hypnotist becoming unscrupulous merely in the presence of opportunity. I have in my possession a form of will in which the testator has made the hypnotist his beneficiary. The man signed it solely because it was presented to him during hypnosis; he had read it aloud and been told that it lacked his signature. Previously, when awake, he had declined to sign it. Finally, and also in virtue of his opportunity, the hypnotist may commit crime against his subject. For example he may rob him. Murder may simulate accident or suicide. A man may be hypnotised as he swims, and told to drown. If you are still in doubt about the perils of hypnotism you can try this experiment provided that you are skilled in life-saving, but the demonstration will lose its force if the man knows that you are skilled.

THE TRAINING OF NURSES

THE departmental committee which is inquiring into the question of the training and registration of nurses in Scotland has held a further meeting at which evidence was given by the Department of Health for Scotland, the Scottish Education Department, and the General Board of Control for Scotland. The Department of Health's evidence, which summarised the history of nurses' training over the last 50 years, emphasised that the training of nurses had arisen out of the needs of the hospitals to minister to their patients and that, naturally, that training was conditioned by and directed to assist other functions of the particular hospital. Other interests are, however, concerned in the training given—namely, the nurses themselves and the public. The status of nurses had improved greatly in the last 20 or 30 years, but a still greater improvement might be looked for which would bring the profession nearer the standard of other professions. At present, training was too sectionalised. This applied even to general hospitals, for while 50 years ago general hospitals were practically the only hospitals and as such gave a training that was in fact "general," general hospitals were now, as a result of the development of special hospitals, dealing with a much narrower field of diseases. Under existing circumstances, a nurse wishing to obtain an all-round training, embracing all sections of nursing, must spend much longer than trainees in other professions, and one of the main questions was whether by coöperation between the various hospitals it would be possible for a nurse to pass from hospital to hospital and obtain such an all-round general training in a reasonable number of years. If a training of this kind could be taken in, say, five years, the nurse would be free thereafter to specialise in any branch she felt drawn to.

The questions discussed with the Scottish Education Department's representative related chiefly to the educational standard that might be required of nurses entering the profession if a standard were to be laid down, and whether it would be possible to make arrangements for suitable instruction being given if any proposal were made for the theoretical subjects being taken before nurses entered hospital. It also emerged that nurses did not have the same benefits of financial aid in training as are enjoyed by most other professions either directly or indirectly. In the opinion of the witnesses from the General Board of Control it would be of advantage if nurses in mental institutions were general-trained. If they had a general training first, it was thought that the period of further training in the mental hospital could be substantially reduced without detriment to the institutions or the nurses.

INSTINCT AND DEVELOPMENT

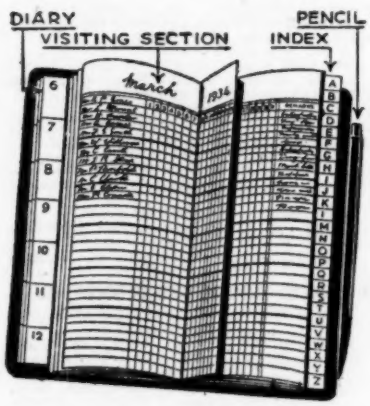
"INSTINKT das eine Mal aüssert sich in der Umbildung der Formen und das andere Mal in der Handlung des ganzen Organismus." That the behaviour of the cells during development and the instinctive reactions of the organism as a whole are in reality two manifestations of the same phenomenon—namely, instinct—is an idea which has already been developed by Bergson. In illustration of this idea Prof. Demoll [1] gives some lively descriptions of a few fascinating examples of instinct among insects. He makes the interesting suggestion that there is a connexion between the rigidity of the developmental processes characteristic of insects and the determined nature of their instinctive reactions. In vertebrates, where development is more plastic, the instinctive reactions are to a greater or less extent modifiable by the nerve centres. These and other related ideas outlined in this book afford food for interesting speculation. But until more is known of the factors involved in development on the one hand and in the reactions of the whole organism on the other, it is impossible to assess

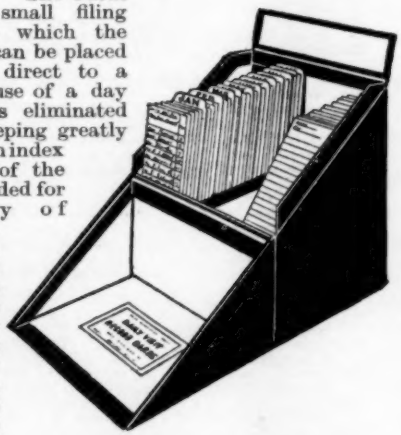
[1] Instinkt und Entwicklung. By Reinhard Demoll. Munich: J. F. Lehmann. Pp. 80. M.2.

their real value. If Prof. Demoll is right, the experimental embryologist and the comparative psychologist will eventually discover that they are investigating the same problem.

A MEDICAL PRACTITIONER'S VISITING BOOK

WE have received from Messrs. S. Straker and o ns, Ltd., 49, Fenchurch-street, London, a new combination of visiting book, day book, address book, diary, and wallet, which is small enough to go into the waistcoat pocket. In a slot on the cover of the visiting book is a daily record card on which names can be entered and added to without removing the card. There is a space at the top of the card for the name of the patient and the date of the visit, and at the side of the card there is a column for ledger entry. The outfit includes a small filing cabinet into which the record cards can be placed for posting direct to a ledger; the use of a day book is thus eliminated and book-keeping greatly simplified. An index at the back of the book is provided for the entry of addresses, while a diary is made to fit the front; the case or cover of the book is durably made so that it will last for some years. A complete trial outfit consisting of ledger, case, diary, visiting book, 100 daily record cards and the filing cabinet costs 12*s*.





REPOPULATION OF THE HIGHLANDS

IT is said that "the eyes of the fool are on the ends of the earth," and Dr. Lachlan Grant of the Bacteriological Laboratory, Ballachulish, in an address to the Clan MacColl Society, Glasgow, declared that too often the eyes of the Scots are bent in the same direction. Dr. Grant deplored Scotland's loss by emigration in the last 50 years of over one million of her inhabitants, while the Highlands had become a sportsman's and tourist's paradise which was rapidly losing its natural heritage and traditions. He pointed out the close connexion between agriculture and industry and stated his belief that the repopulation of the Highlands was an important economic issue. To achieve this he advocated a policy of intensive cultivation of the land, development of natural resources, and help for the industries of the north. His schemes for the reconstruction and regeneration of the Highlands and Islands included a Highland University and a Scottish Parliament sitting in Edinburgh. A bold peasantry once destroyed, he said, can never be replaced, and he called upon all Gaels to help in the work before it was too late. In the course of his address, Dr. Grant read a sympathetic letter he had received from the Prime Minister.

TESTIMONIAL TO SIR THOMAS OLIVER

IN recognition of 55 years spent in the service of Durham University school of medicine, the last eight as president of the College, the Council is offering the colleagues and friends of Sir Thomas Oliver the opportunity of subscribing to a testimonial fund. One of the objects of this fund will be to procure a portrait of Sir Thomas. Contributions should reach the treasurer, Sir Joseph Reed, University of Durham College of Medicine, Newcastle-upon-Tyne, not later than Jan. 31st. Later a meeting of subscribers will be called to decide the final form of testimonial and the mode and time of its presentation.

WHO'S WHO

THE eighty-seventh year of issue of this invaluable book of reference contains over 40,000 biographies, some 500 more than last year, since the 1000 entries deleted on account of death are more than balanced by the 1500 new names. Most of the entries, we are told, have been personally revised and amplified, but fortunately less than 50 new pages have been needed to do this. Apart from its more serious use the volume has its attraction as light reading. The price remains the same, 60*s*., in buckram binding. Messrs. A. and C. Black, Ltd., are the publishers.

A CALENDAR OF MEDICAL HISTORY

THE calendar (or rather diary) issued to members of the medical profession by Messrs. William R. Warner and Co., Ltd., has pages for every day of the year, and a useful section devoted to the kind of fact which is often required in practice but not easily carried in the head. Looking at his diary daily the practitioner will find on his left a statement recalling the activities of his predecessors ("Berengarius between 1502 and 1527 is said to have dissected more than 100 cadavers"), and on the right a sentiment or proverb which may prove consoling or admonitory (An unruly patient makes a harsh physician.—It is probable that some things contrary to probability will happen.—Take away a man's illusions and you take away his happiness.) Copies may be had on application to Messrs. Warner at 300, Gray's Inn-road, London, W.C. 1.

THE HOSPITAL DIARY

THE HOSPITAL DIARY for 1935 retains the attractive features of its first issue, and has responded, as does all good editing, to the suggestions of critics. The diary, which contains four days on an opening, provides the space which even the most conscientious hospital administrator would require for his daily notes; the format and paper are all that could be desired. But to hospital administrators and to many others interested in hospital administration the value of the diary is greatly enhanced by a series of signed articles which occupy the first 80 pages or so of the volume. Major Raphael Jackson opens with a description of hospital administration as a career, followed by Miss Cherry Morris on the duty of an almoner, Miss G. M. Bowes on nursing as a career, and by a series of experts on the construction of a modern hospital and on a number of the problems which confront the hospital to-day. The diary, which is edited by Lieut.-Colonel C. Cobbold, secretary to the London Cancer Hospital, and Mr. H. F. Shrimpton, house governor to the Birmingham Children's Hospital, may be had from Messrs. G. R. C. Brook and Co., 27, Old Bond-street, London, W. 1, for 5*s*. 6*d*.

A GREEN SKELETON

IN the course of road excavations undertaken at Lyons an entirely green skeleton has been exhumed. A description of the bones was given in the *Matin* on Dec. 29th from which we learn that the teeth

are of a brilliant light green and the bones of a dull uniform green. The skeleton was transported to the police laboratory at Lyons, when Dr. Locard considered that the bones were extremely old, dating back perhaps to the Gallo-Roman period. He found an impregnation of copper which could not have been due to any absorption by the individual, and concluded that bronze objects had been placed in the tomb in contact with the skeleton.

NEW PREPARATIONS

LAROSTIDIN. — Hoffmann-La Roche Chemical Works Ltd. (51, Bowes-road, London, N.13) have placed on the market a histidine preparation entitled Larostidin, the exhibition of which in the treatment of gastric and duodenal ulcers is reasonable, while it is held that these ulcers are in many cases the local manifestation of metabolic disturbances produced by an amino-acid deficiency. In support of the efficiency of larostidin in suitable cases the work of Drs. E. Aron and A. G. Weiss is quoted. The former published in the *Presse Médicale* clinical investigations with histidine, the work being based on observations following the artificial production of peptic ulcers, when good results were obtained in a large percentage of cases of acute and chronic ulcers in various places. Evidence is thus brought forward justifying a trial of the preparation, and is strengthened by a communication from Dr. Ernest Bulmer to THE LANCET on Dec. 8th, in which a review of the histidine treatment of peptic ulcer is given.

REDOXON.—The same firm calls attention to Redoxon. Until recently vitamin C was regarded as a vitally important but somewhat elusive substance contained in various fresh fruits and vegetables. Research work carried out in this country and abroad has enabled Szent-Györgyi to show that vitamin C is identical with ascorbic acid. Further recent work has made it possible to produce vitamin C on a large scale, and it is now available for scientific and clinical investigation under the name "Redoxon." In THE LANCET of June 16th, 1934, Dr. J. Gough, lecturer in pathology in the Welsh National School of Medicine, Cardiff, referred to the distribution of ascorbic acid in human tissues—especially to the quantity found in the pituitary gland in illness and health—and before the section of chemistry of the British Association on Sept. 7th last Prof. Szent-Györgyi stated that it had proved useful in a wide variety of diseases. Apart from scurvy, it is suggested that many disorders, including anæmias and dystrophies, might benefit from the use of Redoxon.

A BUREAU OF INFORMATION.—We are informed that Messrs. E. Merck, the well-known Darmstadt chemical firm, opened at the beginning of the year a bureau at 37, Golden-square, London, where information concerning their manufactures will be available in reply to inquiries from the medical profession. They point out that the distribution of the preparations will be conducted as before by Messrs. H. R. Napp Ltd., 3 and 4, Clement's-inn, Kingsway, London.

CORRIGENDUM.—The first annotation in our last issue, entitled Drugs and the Epileptic Subject, reviewed the possibility that bromide taken in large amount may cause mental deterioration. Reference was made to doses as high as 450 g. per day, and it will be obvious that such doses could never have been given. The quantities were *grains*, not grammes, and to accord with our usual practice the abbreviation throughout the article should have been "grs." placed before the figure—e.g., grs. 450.

MENTAL AFTER-CARE ASSOCIATION.—This association, which exists to help those who have suffered from mental illness, is making an appeal for funds. During the past year over 3000 people have been assisted, and the extension of the work to "early care" for incipient mental disorder is giving encouraging results. Contributions may be sent to the secretary, Miss E. D. Vickers, Church House, Westminster, S.W. 1.

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, Jan. 8th.
Therapeutics and Pharmacology. 5 P.M., Dr. R. G. Ranyard West: The Pharmacology and Therapeutics of Curare and its Constituents.
FRIDAY.
Ophthalmology. 8.30 P.M. (Cases at 8 P.M.) Mr. Arnold Sorsby: Choroidal Sclerosis. Dr. D. V. Giri: A Retention Cyst of Unusual Size, probably of Krause's Gland, Simulating Angioma of the Orbit.

PADDINGTON MEDICAL SOCIETY.
TUESDAY, Jan. 8th.—9 P.M. (Great Western Royal Hotel, W.), Dr. G. de Bec Turtle: Some Points on the Management and Treatment of Pneumonia.

SOCIETY FOR THE STUDY OF INEBRIETY.
TUESDAY, Jan. 8th.—4 P.M. (11, Chandos-street, W.), Dr. Percy Turner: Methylated Spirit Drinking.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.
FRIDAY, Jan. 11th.—8.30 P.M. (West London Hospital, W.), Mr. Hugh Cairns: Recent Advances in Intracranial Surgery.

SOUTH-WEST LONDON MEDICAL SOCIETY.
WEDNESDAY, Jan. 9th.—9 P.M. (Bolingbroke Hospital, Bolingbroke-grove, Wandsworth Common), Mr. B. Whitchurch Howell: Orthopædic Cases in General Practice.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Jan. 7th, to SATURDAY, Jan. 12th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W., Friday, 4.15 P.M., Dr. A. E. Clark-Kennedy: Functional Dyspepsia.—NATIONAL HOSPITAL, Queen-square, W.C. Saturday, 3 P.M., Dr. Macdonald Critchley: Neurological Cases.—Courses and clinics are open only to members and associates of the Fellowship.

LONDON SCHOOL OF DERMATOLOGY, 49, Leicester-square, W.C.
TUESDAY, Jan. 8th.—5 P.M., Dr. G. B. Dowling: Seborrhœa and Seborrhœic Dermatitis.
WEDNESDAY.—5 P.M., Dr. I. Muende: Histopathology of Some Common Skin Diseases. (Chesterfield lectures.)
THURSDAY.—5 P.M., Dr. J. A. Drake: "Dermatological Neuroses."

LONDON HOMŒOPATHIC HOSPITAL, Great Ormond-street, W.C.
THURSDAY, Jan. 10th.—5 P.M., Dr. Elizabeth Casson: Some Investigations on Non-lactose Fermenters.

CANCER HOSPITAL (FREE), Fulham-road, S.W.
THURSDAY, Jan. 10th.—4 P.M., Mr. Cecil Rowntree: Treatment of Cancer of the Breast.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, Jan. 11th.—4 P.M., Mr. W. G. Scott-Brown: Allergy.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.
THURSDAY, Jan. 10th.—Mr. Harold Edwards: Diseases of the Colon.

HOSPITAL FOR SICK CHILDREN, Great Ormond-st., W.C.
MONDAY, Jan. 7th.—Noon, Dr. W. W. Payne: The Sedimentation Rate.
WEDNESDAY.—2 P.M., Dr. J. H. Thursfield: Causes and Treatment of Diarrhœa in Children after Infancy.
THURSDAY.—Noon, Dr. A. G. Signy: The Cerebro-spinal Fluid in Clinical Diagnosis.
FRIDAY.—Noon, Dr. B. E. Schlesinger: The Prognosis and Treatment of Pneumonia in Children.
There will be out-patient clinics every day at 10 A.M. and Ward Visits (except on Wednesday) at 2 P.M.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, Jan. 7th.—10 A.M., medical wards, skin clinic. 2 P.M., surgical and gynæcological wards, eye and gynæcological clinics. 4.15 P.M., Mr. Green-Armytage: Pelvic Tumours in Youth and Age.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., throat clinic.
WEDNESDAY.—10 A.M., children's ward and clinic. 2 P.M., medical wards, eye clinic. 4.15 P.M., Dr. Maurice Shaw: Medical Aspects of Life Assurance.
THURSDAY.—10 A.M., neurological and gynæcological clinics. 11 A.M., fracture clinic. 2 P.M., eye and genito-urinary clinics. 4.15 P.M., Mr. G. F. G. Batchelor: Appendicitis.
FRIDAY.—10 A.M., skin clinic. Noon, lecture on treatment. 2 P.M., throat clinic. 4.15 P.M., Dr. Sydney Owen: Difficult and Delicate Infants.
SATURDAY.—10 A.M., medical wards, children's and surgical clinics.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

LEEDS PUBLIC DISPENSARY AND HOSPITAL.
WEDNESDAY, Jan. 9th.—4 P.M., Dr. H. H. Moll: Bronchiectasis.

LEEDS GENERAL INFIRMARY.
TUESDAY, Jan. 8th.—3.30 P.M., Dr. MacAdam: Demonstration of Some Metabolic and Minor Endocrine Disorders.

SALFORD MUNICIPAL CLINIC.
TUESDAY, Jan. 8th.—6 P.M., Dr. E. Tytler Burke: Syphilis, Historical Survey.
THURSDAY.—6 P.M., Dr. E. Tytler Burke: Syphilis, the Causal Parasite. (First two lectures of course.)